

THE
VETERINARY BULLETIN

Vol. 31]

December, 1961

[No. 12

DISEASES CAUSED BY BACTERIA AND FUNGI

Morrison, S. M., Fair, J. F. & Kennedy, K. K. (1961). **Staphylococcus aureus in domestic animals.**—Publ. Hlth Rep., Wash. 76, 673-677. [Abst. from authors' summary.] 3833

The authors' investigation revealed a high incidence of coagulase-positive, antibiotic-resistant *Staphylococcus* in horses, cattle and particularly in dogs and cats. Coagulase production, haemolytic reactions, ability to ferment mannitol, antibiotic resistances, and phage types were determined. They concluded that domestic animals might be a source of staphylococci pathogenic for man.

Live, I. & Nichols, A. C. (1961). **The animal hospital as a source of antibiotic-resistant staphylococci.**—J. infect. Dis. 108, 195-204. 3834

An outbreak of staphylococcal skin disease, caused chiefly by one phage type, among students at a veterinary school is described. The outbreak affected those students working in the animal hospital and it was shown that a number of dogs became infected with the same phage type after entering the hospital. The source of infection was considered to be the hospital environment.

—IAN DAVIDSON.

Sultzter, B. M. & Freedman, H. H. (1961). **Increase in nonspecific resistance to infection in mice following administration of staphylococcal extracts.**—Proc. Soc. exp. Biol., N.Y. 107, 60-63. [Authors' summary modified.] 3835

Intraperitoneal inoculation of staphylococcal extracts into mice protected them against a subsequent lethal challenge of *E. coli* and prolonged survival time of mice infected with *S. typhi-murium*. The same

extracts produced a biphasic fever and a leucopenic response in rabbits, which soon became refractory to their action.

Cohen, J. O., Cowart, G. S. & Cherry, W. B. (1961). **Antibodies against Staphylococcus aureus in nonimmunized rabbits.**—J. Bact. 82, 110-114. [Authors' abst. modified.] 3836

Antibody against staphylococci was demonstrated in the serum of each of 36 non-immunized specific-pathogen-free rabbits that were tested. Two distinct staphylococcal antibodies appeared to be present in the sera from these rabbits. The sera of rabbits obtained from a commercial source contained other antibodies for staphylococci in addition to the two found in specific-pathogen-free rabbits. Normal rabbit serum from specific-pathogen-free animals could be used for differentiation of certain staphylococcal strains.

Sato, G., Miura, S., Miyamae, T., Nakagawa, M. & Ito, A. (1961). **Characters of staphylococci isolated from dead chick embryos and from pathological conditions in chickens.**—Jap. J. vet. Res. 9, 1-13. [In English.] 3837

Staphylococci were isolated from the yolk of 49 of 3,463 embryonated eggs in which embryos had died before reaching hatching stage. About 45% of the strains isolated were coagulase-positive and had properties of *Staph. aureus*. Most of the remaining ones liquefied gelatine. There was no marked difference between coagulase-positive strains from dead embryos and those isolated from either primary or secondary infections of fowls. A few strains from fowls were of low pathogenicity for young chicks, although they had been isolated from cases of septicaemia and from wing-tip gangrene. Of 34 coagulase-positive and 37 coagulase-negative strains,

isolated from dead embryos and lesions in adult fowls, 32 were susceptible to phages of the International Series.—E.G.

Smith, W. W., James, G. A., Miner, M. L., Blommer, E. & Jensen, M. L. (1961). **A phage-typing system for staphylococci from turkeys with synovitis.**—Amer. J. vet. Res. 22, 388-390. [Authors' summary modified.] 3838

Nine staphylophages were obtained from staphylococcal cultures isolated from turkeys, mice, and a soil sample. These new phages, plus bacteriophage 44A, detected marked and consistent differences among staphylococcal strains isolated from turkeys with synovitis. Outbreaks of synovitis in turkeys within a district, such as a mountain valley, were found to be caused by several strains of *Staph. aureus* different from strains occurring in distant areas.

Blair, J. E. & Williams, R. E. O. (1961). **Phage typing of staphylococci.**—Bull. World Hlth Org. 24, 771-784. [Summary in French. Authors' summary modified.] 3839

Standardization of methods is essential if phage typing of staphylococci is to be reliable and if the results obtained in different laboratories are to be compared. This paper, prepared on behalf of the Subcommittee on Phage Typing of Staphylococcus of the Nomenclature Committee of the International Association of Microbiological Societies, gives a detailed account of methods that have been found satisfactory for propagating the phages and defines a standard testing routine by which the stability of the phage preparations can be verified.

Pascoe, R. R. (1961). **An outbreak of bovine mastitis due to streptococci (Group "O", Lancefield).**—Aust. vet. J. 37, 227-228. 3840

Mastitis involved 20 cows in a herd of 25. Eight were examined and streptococci were isolated from five, *Staph. pyogenes* from 1, streptococci and staphylococci from 1, and no pathogens from 1. Eight strains of streptococci were shown to belong to Lancefield's Group O. Clinical response to antibiotics was good in early acute cases, but unsatisfactory in mastitis of long standing.—A. CULEY.

Sainclivier, M. & Plommet, M. (1961). Une campagne d'éradication systématique de la mammitte contagieuse à *Streptococcus agalactiae*. [**Campaign for systematic eradication**

of streptococcal mastitis in cows.]—Rec. Méd. vét. 137, 307-333. [Summaries in English and Spanish.] 3841

Measures for the eradication of streptococcal mastitis in 92 farms containing 1,024 cows, 52% of which were infected, were: treatment of all 4 quarters of infected cows with 3 infusions each of 200,000 units of procaine penicillin in oily excipient at intervals of 48 hours, or 4 infusions of 50,000 units of penicillin in oily excipient at intervals of 24 hours, disinfection of teats, milking machines and cowsheds, and other hygienic precautions. Uninfected cows were treated on the first day only. The procedure was repeated 7 weeks later in farms still producing milk containing streptococci. In 65 farms where the measures were carried out correctly, 98% of 350 infected cows were cured, and in 58 of these farms the infection was eradicated. Milk production in farms freed from the disease rose by 9%.—M.G.G.

Abreu Lopes, J. A. & Braço-Forte, M. da C., Jr. (1960). **Estreptococcia em suínos: otite média complicada de leptomeningoencefalite cerebelosa.** [**Streptococcal otitis media in pigs, complicated by cerebellar lepto-meningo-encephalitis.**]—Rev. Cienc. vet., Lisboa 55, 298-303. [Summary in French.] 3842

Several dozen sporadic cases of purulent otitis media complicated by cerebellar lepto-meningoencephalitis were recorded in pigs of different ages. Clinical, P.M. and histological findings were described. β -Haemolytic streptococci were isolated. *Pseudomonas pyocyanea* predominated among the associated bacteria. Antibiotic therapy was successful when started at an early stage of the disease.—M.G.G.

Seifert, H. (1961). **Der Antistreptolysin- und Antistaphylolysingehalt des Serums und Augenkammerwassers der Haus- und Labortiere.** [**Antistreptolysin and antistaphylolysin in serum and aqueous humour of domestic and laboratory animals.**]—Z. Immunforsch. 121, 375-382. [Summaries in English, French and Spanish.] 3843

Normal values for horse, ox, pig, sheep, goat, duck, fowl, goose, guinea-pig, mouse, rabbit and dog are shown in a table. Over 2,500 determinations were made. Fifty-one sick dogs were also examined and high serum antistreptolysin titres were found in cases of streptococcal sepsis, nephritis, eczema, otitis

and uraemia, while subnormal titres occurred in "actinomycosis", furunculosis, keratitis and enteritis.—R.M.

Lesslie, I. W. (1961). **The tuberculin test and the laboratory diagnosis of tuberculosis.**—Symp. zool. Soc., Lond. No. 4, pp. 11-23. [Author's summary modified.] 3844

A brief history is given of the methods of preparation of tuberculins and the ways in which tuberculin has been applied to the diagnosis of TB. since its discovery by Koch in 1890. L. discussed procedure for characterization of tuberculins; development of the intradermal comparative tuberculin test using mammalian and avian tuberculins and its interpretation in cattle; the tuberculin test in domesticated animals other than cattle particularly in the pig; TB. eradication and laboratory help in confirmation of diagnosis; P.M. examination of positive tuberculin reactors under the Attested Herds Scheme and the isolation and typing of tubercle bacilli from animal tissues: incidence of TB. in cattle and pigs caused by the different types of tubercle bacilli. Careful typing of tubercle bacilli isolated in the laboratory is important in helping to trace the source of infection in both animals and man.

Singer, E. & Rodda, G. M. J. (1961). **Non-specific sensitization to old tuberculin: the ubiquity of acid-fast organisms.**—Tubercle, Lond. 42, 325-332. [Authors' summary modified.] 3845

Dust, soils, and lymph nodes and other organs from domestic animals slaughtered in Brisbane were examined for acid-fast organisms. Milk specimens from Brisbane and Cairns and a few wild mammals captured in Innisfail were also examined. 144 strains of acid-fast organisms isolated from these specimens were compared with type-strains and with 34 strains isolated from sputum in Brisbane and in an American hospital.

Ten strains of *Nocardia* and five of *Mycobacterium phlei* were recognized; 23 strains were probably *M. fortuitum*; a further seven were similar, but formed a black pigment on exposure to light and adequate concentrations of oxygen. 117 strains were similar but not identical to avian type tubercle bacilli and 'Battey' type atypical acid-fast organisms.

Of the remaining 16 strains, ten were similar to *M. butyricum* or *M. balnei*, and six formed large, orange, mucoid colonies.

Oberdorfer, A. & Lebek, G. (1961). Untersuchungen über im Rinderserum vorhandene Nährstoffe für frischgezüchtete bovine Tuberkelbakterien. [**Nutrient factors present in bovine serum for freshly-isolated bovine tubercle bacilli.**]—Z. Naturf. 16b, 304-309. 3846

Protein fractions isolated from bovine serum by ammonium sulphate precipitation or by ion-exchange chromatography supported the growth of bovine tubercle bacilli in synthetic nutrient medium. The protein fractions remained active after extraction with trichloroacetic acid or fat solvents.—R.M.

Clauss, A. (1961). Röhrenverschluss und Primokultur bei dem *Mycobacterium tuberculosis* var. bovis. [**Closure of test-tubes for primary culture of bovine tubercle bacilli.**]—Zbl. Bakt. I. (Orig.) 182, 554-559. [Summaries in English, French, Spanish and Russian. English summary modified.] 3847

In 51 culture growth trials of bovine tubercle bacilli, five different tube stoppers were tested. Paraffin-treated cellulose stoppers and compact rubber stoppers were best; the latter was recommended.

Dormer, B. A., Martinaglia, G. & Hobbs, W. B. (1961). **INH prophylaxis and treatment in bovines.**—S. Afr. med. J. 35, 429-431. 3848

After 74% of the 115 cattle in a dairy herd had given positive or doubtful reactions to the tuberculin test, all the animals were placed on a course of treatment with isoniazid, the daily oral dose being 45 g. for adults graded down to 15 g. for calves. All calves were treated within 7 days of birth. The treatment of adults ceased after 2½ years, and calves and heifers continued to be treated until the age of 2½ years. Coughing stopped and the general condition and milk yield of the animals improved. Out of 23 of the original positive reactors examined P.M., 20 were without lesions and did not yield tubercle bacilli. Of the 70 calves born, only 3 developed positive and 8 doubtful reactions, but the source of infection in these cases was considered to be the sawdust used as bedding from which a mycobacterium closely resembling the avian type was isolated. This strain had a strong affinity for isoniazid, growing several days earlier in medium containing 5-50 µg. of INH per ml. than in control medium.—M.G.G.

Maglione, E. & Ragni, M. (1960). La prova della tubercolina in 74 cani da pastore di allevamenti bovini infetti da tubercolosi. [**Tuberculin test on dogs on infected farms.**] —Atti Soc. ital. Sci. vet. **14**, 606-611. Discussion: pp. 611-612. [Summaries in English and French.] **3849**

Tuberculin (1 ml. of a 1:10 dilution of crude tuberculin) was injected i/v into 74 dogs and their temperatures were recorded at hourly intervals between 8 and 24 hours after injection. Seven gave positive febrile reactions.—R.M.

Bojalil, L. F. & Bastarrachea, F. (1961). **Reliability of the niacin test as an aid in classifying human and bovine strains of tubercle bacilli in epidemiologic studies.** —Amer. Rev. respir. Dis. **84**, 272-275. [Authors' summary modified.] **3850**

A survey was made on 1,091 strains of mammalian tubercle bacilli to differentiate between human and bovine strains. The niacin test was of great help. Testing pathogenicity for lab. animals is expensive, time consuming, and laborious, and should be limited only to those strains that fail to give positive niacin reactions on primary cultures. The over-all incidence of *Mycobacterium bovis* in 1,091 strains isolated from human beings including 987 pulmonary and 104 extrapulmonary cases, was only 0.46%.

Francis, J. (1961). **The effect of age on the susceptibility of guinea pigs to tuberculosis.** —Tubercle, Lond. **42**, 333-336. [Author's summary modified.] **3851**

Guinea-pigs of various ages were infected i/p with bovine or human tubercle bacilli. The average survival times were:—new-born g.pigs, 46 days; month-old, 77 days; two months old, 66 days; four months old, 54 days.

This high susceptibility in extreme youth, high resistance in 'childhood', followed by increasing susceptibility with increasing age provides direct experimental support for the large body of epidemiological evidence indicating that similar age susceptibilities occur in man.

van Rensburg, S. J. & Du Casse, F. B. W. (1960). **A note on the incidence of porcine tuberculosis in South Africa.**—J. S. Afr. vet.

med. Ass. **31**, 465-468. [Abst. from authors' summary.] **3852**

Tuberculous lesions were present in 8% of 13,000 baconers. Mesenteric nodes were as frequently involved as head nodes.

White, L. E., Jr., Penfold, T. W. & Ward, A. A., Jr. (1961). **Management of tuberculosis in monkeys.**—Vet. Med. **56**, 247-249. **3853**

The authors, faced with an outbreak of TB. in a valuable group of experimental monkeys, decided to control the disease by isoniazid as recommended by Ruch in his recent book on the care of laboratory primates. The tuberculin-positive monkeys and their cage-mates were isolated and immediately placed on isoniazid therapy at a daily dose of 80 mg./kg. given in two divided doses and continued for at least six months. The animals were kept in isolation for at least six months after the last negative tuberculin test. Eight monkeys in all were treated, seven of which reacted positively to the tuberculin test. Of these two relapsed and were successfully re-treated while one remained positive for two years and was found at necropsy to have generalized TB. The one monkey which was negative to tuberculin never became infected and it is concluded that the isoniazid therapy had protected it. It thus appears that isoniazid can protect uninfected animals from infection. Because treated and cured monkeys become negative to tuberculin, effect of treatment can be controlled.—R. N. FIENNES.

Lévy, F. M., Conge, G. A., Pasquier, J. F., Mauss, H., Dubos, R. J. & Schaedler, R. W. (1961). **The effect of BCG vaccination on the fate of virulent tubercle bacilli in mice.** —Amer. Rev. respir. Dis. **84**, 28-36. [Summaries in French and Spanish. Authors' summary modified.] **3854**

Evidence suggests that BCG vaccination does not enhance the ability of the animal to destroy or eliminate virulent bacilli at the time of injection, nor does it prevent the establishment of lesions. The beneficial effects of vaccination appear only in a later phase of the infectious process and are manifested in a retardation of bacillary multiplication.

Knorpp, F. (1961). Zur Frage der Übertragung der Geflügeltuberkulose auf das Rind. [**Transmission of avian type tuberculosis to cattle.**] —Inaug. Diss., Munich pp. 30. **3855**

Positive reactions to avian tuberculin developed in 2 cattle fed faeces from tuber-

culous fowls daily for 2 periods of 14 and 10 days, 3 weeks apart, and in 2 fed suspensions of avian type tubercle bacilli for the same periods, but not in 2 kept in contact with 6 tuberculous fowls for 9 weeks, although the food and water troughs of the fowls were situated above the manger, so that the hay became contaminated by the fowls' faeces.

—M.G.G.

Varachiu, N. & Sălăgeanu, G. (1960). Influența extractului tiroidian asupra reacției alergice la păsările tuberculoase. [**Influence of thyroid extract on the tuberculin reaction in infected poultry.**] —Lucr. Inst. Agron. București Ser. C, No. 4 pp. 187-192. [In Roumanian. Summaries in French and Russian.] 3856

I/m doses of 0.2 ml./kg. body wt. of thyroid extract, given at 2-5 hourly intervals for 48 hours, reduced the intensity of the tuberculin reaction in experimentally infected fowls. This might explain weak or doubtful reactions obtained during the early stages of infection, when thyroid activity was stated to be stimulated by the tuberculous process.

—E.G.

Solotorovsky, M., Squibb, R. L., Wogan, G. N., Siegel, H. & Gala, R. (1961). **The effect of dietary fat and vitamin A on avian tuberculosis in chicks.**—Amer. Rev. respir. Dis. 84, 226-235. 3857

Wogan, G. N., Solotorovsky, M., Squibb, R. L. & Siegel, H. (1961). **The serum protein and lipoprotein response to tuberculosis in chicks fed various levels of dietary fat.** —Ibid. 236-241. [Summaries in French and Spanish.] 3858

Reduction of fat concentration prolonged median survival time and reduced the number of tubercles per tissue section in the spleen. The biochemical changes in serum were correlated with infection but not with diet. Increased levels of dietary vitamin A increased the percentage of survivors among infected chicks.—R.M.

Furniss, A. L., Collins, C. H. & Marks, J. (1961). **A case of infection with avian type tubercle bacilli.** —Mon. Bull. Minist. Hlth Lab. Serv. 20, 126-128. 3859

Avian-type tubercle bacilli were isolated repeatedly from the sputum of a 68-year-old woman with achalasia of the cardia of 17 years' standing. The woman died eventually of TB., after repeated haemoptyses. No information was obtained as to contact with birds.—E.G.

Nagayama, H., Konno, K. & Oka, S. (1961). **Formamidase in mycobacteria and its use in differentiating saprophytic mycobacteria from other mycobacteria.** —Nature, Lond. 190, 1219-1220. 3860

An enzyme which catalyses the formation of ammonia from formamide was found only in saprophytic strains among 23 mycobacteria tested. The name formamidase is proposed by the authors.—E.V.L.

Brotherston, J. G., Gilmour, N. J. L. & Samuel, J. McA. (1961). **Quantitative studies of *Mycobacterium johnei* in the tissues of sheep. I. Routes of infection and assay of viable *M. johnei*. II. Protection afforded by dead vaccines.**—J. comp. Path. 71, 286-299 & 300-310. [Authors' conclusions modified.] 3861

In lambs given *M. johnei* by the intravenous and oral routes progressive infections could not be detected by quantitative viable counts on liver, spleen or mesenteric lymph nodes. By oral administration of graded doses it was possible to show that the intestinal mucosa was the most probable site of multiplication. In critical studies on infection and resistance in Johne's disease it will be necessary to examine quantitatively the occurrence of the organisms in the intestine as well as in the associated lymph nodes.

By quantitative assay of *M. johnei* in the mesenteric and portal lymph nodes it was possible to show an increased clearance of the organisms from the tissue of sheep challenged intravenously, but not in orally challenged sheep. Organisms could not be detected in the liver or spleen of sheep infected by the oral route.

Subcutaneous adjuvant vaccine enhanced the sheep's ability to overcome intestinal infection while oral vaccination did not. Vaccination did not prevent the invasion of the lymph nodes of sheep challenged orally. The distribution of organisms in the mesenteric lymph nodes and intestinal mucosa was such that examination of the nodes alone would have missed a number of infected sheep. Lambs dosed with vaccine at 3 months of age were as susceptible to oral infection as those dosed at 3 weeks of age.

Bica-Popii, V. & Diaconescu, A. (1960). Frecvența leziunilor produse de *C. pyogenes* și *C. renale* la porcinele și bovinele sacrificate la abatorul București. [**Incidence of lesions produced by *Corynebacterium pyogenes* and *C. renale* in pigs and cattle slaughtered in**

Bucharest.] — Lucr. Inst. Agron. București Ser. C, No. 4 pp. 135-140. [In Roumanian. Summaries in French and Russian.] 3862

There were no corynebacterial lesions in about 1,000 adult pigs slaughtered at the Bucharest abattoir. In 12 of 130 piglets aged 1-4 months, *C. pyogenes* lesions were present in subcutaneous tissue, muscles, lungs, liver, spleen and kidneys. Of 2,270 adult cattle, only three had pyelonephritis due to *C. renale*, and 320 young cattle were free from infection.

—E.G.

Nigg, C. & Johnston, M. M. (1961). **Complement fixation test in experimental clinical and subclinical melioidosis.** — J. Bact. 82, 159-168. [Authors' abst. modified.] 3863

Soluble stable antigens prepared from *Pseudomonas pseudomallei* [Pfeifferella whitmorei] gave strongly positive c.f. reactions in a dilution of 1 to 8,000 when tested with specific rabbit antiserum diluted 1 to 10,000. The test was positive in experimentally infected rabbits 9 to 11 days after infection. Infected g.pigs and monkeys showed similar results.

Zhuravlev, V. V. (1961). [Immunization of pigs with the Roumanian attenuated Strain BP-2 of *erysipelas bacillus*.]—Veterinariya, Moscow No. 7 pp. 41-42. [In Russian.] 3864

The Roumanian vaccine was used on 81,700 pigs with good results. Immunity appeared to last 6 months.—R.M.

Potel, J. & Degen, L. (1961). Zur Serologie und Immunbiologie der Listeriose. II. Mitteilung. Untersuchungen von Fraktionen aus List. monocytogenes und eines Haptens (Allergens) für die Intrakutandiagnose der Listeria-Infektion. [Serology and immunobiology of listeriosis. II. Antigenic fractions for the intradermal test.] — Zbl. Bakt. I, (Orig.) 182, 210-224. [Summaries in English, French, Spanish and Russian.] 3865

Both specific and non-specific fractions were obtained from *L. monocytogenes* cells. Such fractions might interfere with diagnostic tests. A proteo-lipid fraction that caused specific allergic reactions in immunized and infected lab. animals and human beings was isolated. It has no antigenic properties and is non-pyrogenic.—M.G.G.

Adinarayanan, N. & Singh, S. B. (1961). **Infectious bovine keratitis with special reference to isolation of *Moraxella bovis*.**—Vet. Rec. 73, 694-696. 3866

On a government dairy farm at Mathura, India, *Moraxella* [*Haemophilus*] *bovis* was isolated from 37 calves, all under six months of age, with contagious keratitis. Random examination of 40 apparently healthy adult cattle and buffaloes of a total of 278, revealed seven carriers, two of which were cows and five buffaloes. The disease was reproduced clinically in a calf by ocular instillation of a culture suspension prepared from a freshly isolated strain. Morphological and biochemical characteristics of the organism were described.—E.G.

Winsser, J. (1960). **A study of *Bordetella bronchiseptica*.**—Proc. Anim. Care Panel 10, 87-104. [Author's abst. modified.] 3867

Haemophilus bronchisepticus is a common inhabitant of the respiratory tract and middle ear of wild, domestic, and laboratory animals, in which it can induce a carrier state or overt illness. Man can occasionally become infected. A specific antibody in the serum does not influence the carrier state but may prevent overt illness. A lowered resistance of the animal may upset the balance of the carrier state. Rather than attempt to eliminate the organism from a laboratory animal colony by vaccination and/or antibiotics, one should set up an uninfected colony and prevent the introduction of the agent by strict isolation and hygiene.

Philip, J. R. & Shone, D. K. (1960). **Some observations on oedema disease and a possibly related condition of pigs in Southern Rhodesia.**—J. S. Afr. vet. med. Ass. 31, 427-434. [Authors' summary modified.] 3868

An account of incidence, epidemiology and pathology. Haemolytic *Escherichia coli* serotypes isolated from oedema disease in Southern Rhodesia are the same as those found in Gt. Britain. The disease was reproduced in one pig by i/v inj. of Seitz-filtered intestinal material from 3 affected pigs.

Haemorrhagic, and sometimes diphtheritic enteritis mainly in store and fattening pigs, appears to be related to oedema disease.

Kaplan, H. M. (1958). **Treatment of escherichiosis in turtles, frogs and rabbits.** — Proc. Anim. Care Panel 8, 101-106. [Author's summary modified.] 3869

Chloramphenicol, given by various routes, in an initial dose of 6 mg./100 g. of living body weight, followed by 3 mg./100 g. twice daily for seven days, improved the structure of the r.b.c. and the general health of turtles, frogs and rabbits infected naturally or experimentally with *Escherichia freundii*. This pathogen causes a disease primarily of turtles now termed "escherichiosis".

Kuida, H., Gilbert, R. P., Hinshaw, L. B., Brunson, J. G. & Visscher, M. B. (1961). **Species differences in effect of gram-negative endotoxin on circulation.**—Amer. J. Physiol. 200, 1197-1202. 3870

The authors studied the haemodynamic effects in the systemic, portal, and pulmonary circulations produced by *E. coli* endotoxin in cat, rabbit, and monkey. Gross and microscopic examination was also made of thoracic and abdominal viscera obtained from monkeys given endotoxin. The results indicate that among the experimental animals the dog is unique in its capacity to respond by immediate and intense hepatic venous constriction.

—R.M.

McCabe, W. R. (1961). **Tolerance to bacterial endotoxin produced by proliferation of Gram negative bacteria in the kidney.**—Proc. Soc. exp. Biol., N.Y. 107, 402-404. [Author's summary modified.] 3871

Infection of the kidney by Gram-negative bacteria was capable of inducing tolerance to heterologous endotoxin. A previous study failed to demonstrate pyrogen tolerance following experimental *E. coli* peritonitis in rabbits, but these apparently conflicting observations may reflect only a difference in the two types of infection.

Soerathno (1961). **Some cases of salmonellosis in domestic animals.**—Commun. vet., Bogor 5, 39-44. [In English. Summary in Indonesian.] 3872

In Indonesia the following salmonella organisms were isolated P.M. from either organs, blood or faeces of domestic animals: *S. cholerae-suis* from a dog and a cat, *enteritidis* from a dog, *javiana* from a bull, *stanley* from an elephant, *typhi-murium* from two calves and *weltevreden* from another calf. Whether or not salmonellosis was the cause of death in these animals was not established.

—E.G.

Dixon, J. M. S. (1961). **Rapid isolation of Salmonellae from faeces.**—J. clin. Path.

14, 397-399. [Abst. from author's synopsis.] 3873

Brilliant green MacConkey agar was the most satisfactory solid selective medium both for direct plating and as a sub-culture medium, giving large characteristic colonies after 24 hours' incubation. Selenite F medium, inoculated with undiluted faeces, incubated at 43°C., and subcultured after six hours' incubation on to brilliant green MacConkey agar, was the most successful rapid method of enrichment, though the results were considerably inferior to those obtained after 24 hours' incubation.

Morris, B. (1961). **The transmission of anti-Salmonella agglutinins from the mother to the young in *Erinaceus europaea*, with some observations on the active immunization of suckling hedgehogs.**—Proc. roy. Soc. Ser. B. 154, 369-376. [Author's abst. modified.] 3874

Transmission of passive immunity occurred both before and after birth, but the greater part of it occurred after birth. Uptake of antibody from the milk by the gut occurred during the first 20 days of lactation and probably continued up to 30 days of age. The serum titre of the young never equalled that of the mother. The milk titre shortly after birth was half the maternal serum titre and this proportion was maintained throughout lactation.

Unweaned hedgehogs given a single injection of *Br. abortus* at 9-21 days of age produced low circulating titres after 6 days, and are thus able to produce specific agglutinins during the period when antibody is being absorbed from the milk.

Mitsuhashi, S., Sato, I. & Tanaka, T. (1961). **Experimental salmonellosis. Intracellular growth of *Salmonella enteritidis* ingested in mononuclear phagocytes of mice, and cellular basis of immunity.**—J. Bact. 81, 863-868. [Authors' summary modified.] 3875

Infection with salmonella of mononuclear phagocytes from the abdominal cavity of mice showed that the intracellular multiplication of a virulent strain was rapid, and phagocytes were destroyed within 3 days of incubation. However, the intracellular growth of an attenuated strain was inhibited after a slight increase in number of bacteria, and reached a "carrier state".

Serum from normal mice or from mice immunized with live or dead vaccine had no inhibitory effect on intracellular growth of the

virulent strain. Phagocytes from mice immunized with live vaccine inhibited intracellular multiplication of the virulent strain regardless of the presence of antibody in the medium, whereas the cells of mice immunized with dead vaccine did not.

Howard, J. G. (1961). **Resistance to infection with *Salmonella paratyphi C* in mice parasitized with a relatively avirulent strain of *Salmonella typhimurium*.** — *Nature*, Lond. 191, 87-88. 3876

Nineteen mice of 20 previously infected with an avirulent strain of *S. typhi-murium* survived challenge with *S. paratyphi C* which killed all the controls. It is improbable that such a high degree of resistance can be explained by the minor flagellar antigenic relationship between these species, nor would the raised phagocytic activity of the reticulo-endothelial system alone provide a satisfactory explanation. Previous parasitization of reticulo-endothelial cells by *typhi-murium* seems to inhibit subsequent multiplication within those cells of a secondarily invading salmonella, even though not of the same or closely related species.—E.V.L.

Redaelli, G. & Giolitti, G. (1960). Osservazioni sulla qualità igienica delle farine animali ad uso zootecnico. [**Contaminants of meat, fish and bone meals.**]—*Atti Soc. ital. Sci. vet.* 14, 674-677. [Summaries in English and French.] 3877

The authors examined bacteriologically 53 samples of meals. Salmonella present in 5 samples of fish meal and one of meat meal were typed as *schwarzengrund*, *binza*, *orion* and *mediolanensis* (new serotype). *Staph. aureus* and *Cl. welchii* were also common contaminants.—R.M.

Börger, K. (1961). Die Rinderbrucellose-Bekämpfung: Rückblick und Ausblick. [**Control of bovine brucellosis: retrospect and prospects.**] — *Tierärztl. Umsch.* 16, 271-274. 3878

In the German Federal Republic, the most satisfactory method of control of bovine brucellosis was (apart from culling reactors) the vaccination of heifer calves. B. discussed the value of Strain 19, differentiation between vaccination and infection titres, the slow agglutination test and doubtful reactions to serological tests. He rejected the suggested examination of milk rather than blood samples and advocated discontinuance of vaccination of cows and heifers in infected areas.—E.G.

Heuner, F. (1961). Probleme der Standardisierung von Brucella-Testflüssigkeit. II. Zur Frage der Fehlergrenzen bei der Keiten für die Langsamagglutination. [**Problems of standardization. II. Limits of error in the standardization of brucella antigen for tube agglutination.**]—*Rindertuberk. u. Brucellose* 10, 68-74. 3879

In the tube agglutination test for brucellosis, factors such as the different sensitivity of standard sera of different origin, different electrolyte content of the medium, and variations in titre during repeated tests with the same serum and the same antigen caused slight errors which, however, do not affect the value of standardization.—M.G.G.

Amerault, T. E., Manthei, C. A., Goode, E. R., Jr. & Lambert, G. (1961). **A heat-inactivation test for differentiating specific and nonspecific agglutination reactions for bovine brucellosis.**—*Amer. J. vet. Res.* 22, 564-569. [Authors' summary modified.] 3880

The thermolability of specific and non-specific agglutinins for brucellosis found in bovine serum was studied. A heat-inactivation test (HIT) was devised to inactivate non-specific seroagglutinins encountered in the standard tube agglutination test (STT) for brucellosis. When serum samples from 143 artificially exposed and 410 naturally exposed cattle were tested by both these tests, (1) positive HIT serological reactions were obtained from all of the artificially and naturally exposed STT-suspect and reactor cattle from which *Br. abortus* was isolated; (2) negative serological reactions were obtained from 74% of the artificially and naturally exposed STT-suspect cattle from which *Br. abortus* was not isolated.

Moody, M. D., Biegeleisen, J. Z., Jr. & Taylor, G. C. (1961). **Detection of brucellae and their antibodies by fluorescent antibody and agglutination tests.** — *J. Bact.* 81, 990-995. [Authors' summary modified.] 3881

Conditions are described for three kinds of fluorescent antibody test for brucella. Sensitivity and specificity of the tests were compared with those of cultural and agglutination techniques. Positive fluorescent antibody reactions were demonstrable with smears of suspensions containing as few as 2,500 viable or non-viable brucella organisms per ml. Massive bacterial or environmental contamination did not appear to affect sensitivity or specificity. Positive agglutination reactions required suspensions containing no less than

60 million cells per ml. Higher serum antibody titres were obtained by inhibition tests than by indirect fluorescent antibody tests.

Parnas, J. & Chodkowski, A. (1961). Weitere Analyse der Virulenz und der immunogenen Eigenschaften verschiedener Brucellenstämme sowie die immunobiologische Reaktivität des immunisierten Organismus. [Virulence and immunogenic properties of various brucella strains, and the immunobiological reactivity of the immunized animal.] — Z. Immunforsch. 121, 277-290. [Summaries in English, French, German and Spanish.] 3882

The authors compared three attenuated strains: the American Strain 19, the Russian Strain BA and their own Strain PD. Another 47 Polish brucella strains were examined and seven had properties similar to the three attenuated strains. The authors confirmed that Strain BA was less virulent for guinea-pigs than Strain 19.—R.M.

van Drimmelen, G. C. (1961). Recent developments in the epidemiology of brucellosis in South Africa. — Ann. Soc. belge Méd. trop. 41, 73-79. [In English. Summaries in French, German, Spanish and Flemish. Author's summary modified.] 3883

Experience with brucella infection in southern parts of Africa reveals four epidemiologically distinct forms of the disease. (1) *Br. melitensis* infection, associated with goat and sheep farming especially Karakul sheep farming in western territories and frequently causing severe symptoms in man. (2) *Br. abortus* infection, associated with cattle farming in all parts and infrequently causing severe symptoms in other animals and man. (3) *Br. abortus-ovis* infection, fairly common in small stock in all parts, often a self-limiting and transient disease not known to be transmitted to other animals and man. (4) *Br. ovis genitalium* infection, causing genic for other animals and man.

Ralston, D. J. & Elberg, S. S. (1961). Intramonocytic destruction of brucella: potentiating effect of glycine on intracellular lysozyme activity. — J. infect. Dis. 109, 71-80. [Authors' summary modified.] 3884

Addition of 0.03 M glycine to parasitized monocytes from normal rabbits depressed the intracellular growth of *Br. melitensis* Strain Rev Is. Glycine did not affect survival of the monocytes. The glycine effect occurred in cell cultures treated with enough streptomycin to

prevent extracellular multiplication of any unphagocytized bacteria. Streptomycin alone (50 to 500 µg. per ml.) did not influence intracellular growth of the bacteria. Extracts of parasitized monocytes were shown to contain a lysozyme-like material. Together with sufficient glycine, this material accelerated lysis and killed the brucella; the rough variant of the strain was more easily affected than the smooth form. In the infected monocyte treated with glycine, a similar relationship was observed. These results suggest that glycine was taken up by the monocytes and altered the intracellular bacteria so that the lysozyme-like factor could inhibit bacterial growth.

Rozansky, R. & Sulitzeanu, D. (1961). Failure of brucellae to develop resistance to streptomycin in laboratory animals. — Antibiot. & Chemother. 11, 441-444. [Authors' summary.] 3885

Mice infected with *Br. abortus* and guinea pigs infected with *Br. abortus* and *Br. melitensis* were treated with dihydrostreptomycin for various periods. Brucellae later isolated from the spleens of these animals were as susceptible to the antibiotic as the origin strain.

Kenzy, S. G., Gillespie, R. W. H. & Lee, J. H. (1961). Comparison of *Leptospira pomona* bacterin and attenuated live culture vaccine for control of abortion in cattle.—J. Amer. vet. med. Ass. 139, 452-454. [Authors' summary modified.] 3886

Abortions associated with *L. pomona* in a herd continued for 30 days after inoculation of a commercial killed vaccine; 17 abortions were observed in 75 cows; 6 abortions occurred in a similar number of cows inoculated with an attenuated live-culture vaccine. The leptospire was isolated by inoculating urine from cows which aborted into g.pigs. It could not be recovered from foetal tissues, although leptospira-like organisms were present in stained sections of foetal liver.

Turner, L. W. (1961). Experimental leptospirosis in the chinchilla (*Chinchilla laniger*). — Cornell Vet. 51, 420-430. [Author's summary modified.] 3887

Twenty chinchillas inoculated with *Leptospira pomona* all became infected. Leptospires were isolated from the blood from the 1st day after inoculation until death from the infection after about a week.

Haemorrhage and congestion were

common gross lesions in the lung, liver and spleen. The most common microscopic lesions were the disruption of hepatic cords, haemosiderosis of the spleen, cloudy swelling of the renal tubules, and haemorrhages in the lung. Leptospire were found in practically every organ in the body.

It is concluded that the chinchilla would be a better laboratory animal than those commonly used for the diagnosis of leptospirosis.

Füzi, M. & Csóka, R. (1961). **An egg-yolk reaction test for the differentiation of leptospirae.**—J. Path. Bact. **82**, 208-212. [Authors' summary modified.] **3888**

In an examination of 60 pathogenic strains belonging to 41 different serotypes and 11 strains of water leptospirae, it was found that saprophytic strains rapidly decomposed egg-yolk, but pathogenic strains decomposed it slowly or not at all.

Sleight, S. D. & Lundberg, A. M. (1961). **Persistence of *Leptospira pomona* in porcine tissues.**—J. Amer. vet. med. Ass. **139**, 455-456. [Authors' summary modified.] **3889**

The organism was isolated from porcine brain tissue up to 18 days after [? subcutaneous] inoculation, but it was not isolated from spleen, liver, and blood until the 10th day after inoculation. Leptospire were present in the kidneys from the 4th day onwards. Although there seemed to be a definite relationship between the appearance of circulating antibodies and the disappearance of organisms from blood, liver, and spleen, this did not apply to kidneys and brain.

Wagner, W. C., McEntee, K. & Gilman, H. L. (1961). **The experimental inoculation of heifers with *Vibrio fetus* of ovine origin.**—Cornell Vet. **51**, 441-450. [Authors' summary modified.] **3890**

Intracervical and intra-uterine inoculations were performed on nine heifers using recently isolated foetal strains of ovine *V. fetus*. The organism was recovered from seven of the nine heifers, but not longer than 28 days after inoculation. Four heifers developed low vaginal-mucus titres (1:100). Endometrial biopsy revealed mild endometritis in some of the heifers. Subsequent challenge with a bovine foetal strain produced infection in three control heifers but in only two of the nine heifers which had received the sheep vibrio. None of the nine test heifers

developed endometritis after challenge, but two of the three controls did.

Reich, C. V., Heist, C. E. & Dunne, H. W. (1961). **Agglutinin-adsorption analysis of *Vibrio fetus*.**—J. Bact. **82**, 210-214. [Authors' abstr. modified.] **3891**

All pathogenic strains of *Vibrio fetus* are apparently members of a single serotype. The relationship of certain selected strains was defined by complete reciprocal adsorption and cross agglutination, using formalin-treated suspensions of *V. fetus* and homologous rabbit antisera. The reactions of five strains were analysed. A system of 12 antigens and 4 haptens was necessary to reproduce the reaction pattern obtained. A somatic antigen (antigen A) was present on every strain examined. It represented about 5% of the total antigenic area of the cell surface.

Littlejohn, A. I. (1961). **Field trials of a method for the eradication of foot-rot.**—Vet. Rec. **73**, 773-780. [Author's summary modified.] **3892**

Field trials in 1957 involving 1,477 infected sheep in 15 flocks in the south of England have shown that, using the principles established by Beveridge, it is possible to eradicate foot-rot from an ordinary commercial flock, with the simplest of handling facilities and using only 10% formalin as a medicament. General observations are made on the procedure adopted and particular emphasis is placed on the importance of adequate paring of the infected foot.

Thomson, A. (1961). **The value of vaccination in the prevention of anaerobic diseases in Great Britain.**—Bull. Off. int. Epiz. **56**, 916-921. [In English. In French pp. 922-928. Summary in Spanish.] **3893**

A discussion of recent work on *Clostridium welchii* infections in sheep, and on combined clostridial vaccines.—R.M.

Stephen, J. (1961). **The isolation of the α -toxin of *Clostridium welchii* type A by zone electrophoresis in vertical columns.**—Biochem. J. **80**, 578-584. [Author's summary modified.] **3894**

Culture filtrates of Type A, concentrated by high-pressure ultrafiltration, were examined by zone electrophoresis and immuno-electrophoresis. The alpha-toxin was quantitatively separated from the hyaluronidase, proteolytic and theta-toxin activities. The lecithinase, haemolytic and lethal activities were electrophoretically inseparable. Immuno-

electrophoresis revealed that at least nine different antigens were present in one crude preparation and at least 25 in another. The alpha-toxin was shown to be free from the other eight antigens but was of low specific activity.

Ellner, P. D. (1961). **Fate of partially purified C¹⁴-labeled toxin of *Clostridium perfringens*.** —J. Bact. 82, 275-283. [Author's abst. modified.] 3895

Labelled toxin was injected i/v into mice and rabbits. Toxin disappeared rapidly from the bloodstream with radio-activity appearing in the urine and expired air 10-20 min. later. The organs primarily responsible for uptake of toxin from the blood were liver (72%), lungs (15%), kidney (8%), and spleen (5%). The toxin was not bound to skeletal muscle. Fractionation of the liver into subcellular particles by centrifugation showed the radio-activity to be concentrated in the mitochondrial fraction.

Hirsch, H. A. & Paine, T. F., Jr. (1961). **Experimental uterine tetanus in mice.** —J. Path. Bact. 82, 195-198. [Authors' summary modified.] 3896

Spores of *Clostridium tetani* alone did not produce tetanus after subcutaneous or intra-uterine injection in mice. Calcium chloride, certain bacteria, and mouse embryonic tissue, were effective adjuvants in promoting tetanus infection. Spores injected together with an adjuvant into the non-pregnant mouse uterus produced tetanus about half as frequently as the spores injected subcutaneously.

The implantation of spores into the mouse uterus after abortion had been induced led to tetanus in every instance. Spores were still viable 2-6 weeks after subcutaneous or intra-uterine injection and could be activated by calcium chloride or by *Staphylococcus aureus* injected at the site of the previous spore implantation.

Flock, M. A., Yarinsky, A. & Duff, J. T. (1961). **Studies on immunity to toxins of *Clostridium botulinum*. VII. Purification and detoxification of trypsin-activated type E toxin.** —J. Bact. 82, 66-71. [Authors' abst. modified.] 3897

Purification of the toxin was accomplished by precipitation with ammonium sulphate, extraction with calcium chloride, and re-precipitation with ethanol in the cold. Purified toxins were converted to toxoid by incubation with formalin and adsorbed on

aluminium phosphate. Good immune responses were obtained to the toxoids in mice, g.pigs, and rabbits.

Müller, J. (1961). **Type C-botulisme hos mennesker og dyr (med særligt henblik på sygdommens forekomst hos kvaeg og hest). [Type C botulism in man and animals—incidence in cattle and horses.]** —Medlemsbl. danske Dyrlaegeforen. 44, 547-557. [In Danish.] 3898

M. discussed the literature (26 references). Studies at the State Veterinary Serum Laboratory, Copenhagen, in 1959/60 have afforded proof that most of the outbreaks of two diseases referred to in Danish legislation as "Infectious oesophageal paralysis in cattle" and "Malignant spinal cord typhus in horses", (known for at least 50 and for over 100 years respectively), are in fact botulism caused by Type C toxin.

Samples of liver from cattle and horses from field outbreaks were examined by injection of extracts into mice, and in 10 of 12 outbreaks botulinum toxin was demonstrable, often in considerable amounts. Neutralization tests in all cases examined showed that the toxin was Type C. Direct anaerobic culture from the liver samples confirmed this. The disease was reproduced in a cow and in a horse by feeding toxic liver suspensions from field outbreaks: in the cow illness occurred after 45 hours and death 41 hours later; in the horse which received about a million mouse lethal doses, i.e., double the dose given to the cow, illness occurred after 18 hours and death 4 hours later. At P.M. examination of these two experimental cases only weak traces of botulinum toxin were found in duodenal content and liver, but they were examined shortly after death, whereas in the field cases several days had elapsed. Of 23 livers from cows or horses from outbreaks of botulism in the field botulinum toxin (Type C) and the presence of *Cl. botulinum* were demonstrable in 18; the toxin alone in one; the organism alone in one; and neither was demonstrable in three.

That Type C botulism is so rare in man (only two cases appear to have been recorded) is ascribed to the low toxicity of the toxin for man except in very large doses, and to the low heat-resistance of the spores (though they resisted heating at 60° for an hour, they were killed, in unpurified cultures, by 100° for 10-15 min., and Type C toxin was destroyed after 5 min. at 80°C.).—F.E.W.

Månsson, I. & Olsson, B. (1961). **The presence of anaerobic bacteria of Clostridium type in intestinal content and certain skin changes in pigs.**—Acta path. microbiol. scand. Suppl. No. 144 pp. 257-258. [In English.] 3899

Zinc-deficiency parakeratosis produced in pigs by feeding a high-protein dry diet was accompanied by a sharp increase, at the time of appearance of skin lesions, in numbers of clostridia in the faeces (from 100 bacteria per gramme to 1,000,000). Numbers of enterococci and "resident bacteria" remained unchanged. The clostridia have not yet been classified.—R.M.

Wheater, D. W. F. & Hurst, E. W. (1961).

The effect of sex on bacterial infections in mice and on the chemotherapy of one of them.

—J. Path. Bact. 82, 117-130. [Authors' summary modified.] 3900

To small infecting doses of several bacterial pathogens (*Streptococcus agalactiae*, *Str. pyogenes*, *Str. pneumoniae* and *Salmonella dublin*), the female mouse is rather less susceptible than the male. Pretreatment of intact or gonadectomized animals with oestradiol promotes longer or more frequent survival than obtains with testosterone treatment or in mice not receiving hormonal therapy, but under some conditions the male hormone also exercises a beneficial influence.

The sexual difference with *Str. agalactiae* is greatly enhanced when the infection is treated with suboptimal doses of streptomycin or chloramphenicol, but not when it is treated with sulphonamides, chlortetracycline or benzylpenicillin. Under the influence of antibiotic therapy, the sexual difference is revealed also with infecting doses of organisms too large to permit its demonstration in the untreated animal.

Oestradiol appears to enhance the therapeutic effect of streptomycin in the male, stilboestrol to enhance it in the male and diminish it in the female, and testosterone to enhance it especially in the female. Oestradiol diminishes the therapeutic effect of a low dose of chloramphenicol and stilboestrol diminishes that of a higher dose as well. Testosterone appears to enhance the action of chloramphenicol in the male.

Vaccination of mice prior to infection also serves to demonstrate the greater resistance of female mice to doses of bacteria too large to allow emergence of a clear sexual difference in non-vaccinated animals. This resistance is associated with greater protective

effect of female immune serum when administered to non-vaccinated mice prior to infection. The female immune serum is also a more potent inhibitor of bacterial growth.

Hagen, K. W., Jr. (1959). **Chronic respiratory infection in the domestic rabbit.**—Proc. Anim.

Care Panel 9, 55-60. [Author's summary modified.] 3901

Chronic respiratory infection was studied in a colony of 45 mature does. Of 857 offspring 35 developed respiratory infection and died. *Pasteurella multocida* was the predominant organism isolated from respiratory tracts, being found in 54%. *Haemophilus bronchisepticus* and *Streptococcus pyogenes* were also isolated. The lungs exhibited bronchopneumonia, with consolidation and necrosis. The trachea was inflamed, and the bronchi were filled with a thick, purulent exudate. Experimental studies suggested that infection is transmitted from mother to young via the respiratory route within a few days of birth.

A ration containing 0.025% sulphaquinoxaline was continuously fed to 20 does and their young for 12 months. The ration was palatable and no toxic effects were noted. There were no deaths from primary pneumonia and the number of *Past. multocida* isolates fell by 70%.

Thirty-two does and their young were fed a ration containing 0.0055% furazolidone. The ration was palatable and non-toxic. The number of deaths from primary pneumonia was reduced and pasteurella could not be isolated.

Baruah, H. K. (1961). **The air spora of a cowshed.**—J. gen. Microbiol. 25, 483-491.

[Author's summary.] 3902

Study of the air spora of a cowshed by means of a Hirst Automatic Volumetric Spore Trap showed an atmospheric concentration of fungal spores ranging from 95,000 to 16,000,000 spores/m³. There was a direct relationship between the hours during which hay was being fed and the highest concentrations of spores. *Aspergillus-Penicillium* and *Mucor* types of spore were predominant, and hyphal fragments including conidiophores were the third most numerous component. The findings are discussed with reference to human and animal fungal disease.

—Wright, M. L., Anderson, G. W. & McConachie, J. D. (1961). **Transmission of aspergillosis**

during incubation.—Poult. Sci. 40, 727-731.
[Authors' summary modified.] 3903

Mould penetration of embryonating eggs within 8 days after dusting them with spores of *Aspergillus fumigatus* was evident by ordinary candling methods. Chicks hatched from eggs indexed as internally mouldy on the 18th day of incubation. Contamination with the infective agent was demonstrable on the down of chicks selected at random from the hatching compartment. Exposure to low concentrations of formaldehyde vapour of chicks already exposed to the fungus increased respiratory symptoms as well as the prevalence of the mould in the lungs at 10 days of age.

Codner, R. C., Cruickshank, C. N. D., Trotter, M. D. & Wood, S. R. (1961). **The production of trichophytin antigen in submerged culture of *Trichophyton mentagrophytes*.**—Sabouraudia 1, 116-122. [Summary in German. Authors' abst. modified.] 3904

Trichophyton produced in submerged cultures was sufficiently free from irritant properties to be used clinically and may be further purified for investigation of the relationship between its chemical structure and biological activity.

—Dolan, M. M. & Fendrick, A. J. (1959). **Incidence of *Trichophyton mentagrophytes* infections in laboratory rats.**—Proc. Anim. Care Panel 9, 161-164. [Authors' summary modified.] 3905

An outbreak of ringworm in laboratory rats caused by *T. mentagrophytes* is reported. The carrier state may develop into overt infection when temp. and humidity are favourable. A survey of the incidence of *T. mentagrophytes* carriers revealed positive cultures in 237 of 600 rats from conventional breeding stock. All cultures from the hair of 600 rats from pathogen-free stock were negative.

Kaplan, W. & Ivens, M. S. (1961). **Observations on the seasonal variations in incidence of ringworm in dogs and cats in the United States.**—Sabouraudia 1, 91-102. [Summary in German. Authors' abst. modified.] 3906

There appeared to be seasonal variations in the incidence of ringworm in dogs and cats. Patterns of incidence appeared to vary with the dermatophyte involved.

O'Sullivan, J. G. (1961). **Griseofulvin treatment in experimental *Microsporum canis* infection in the cat.**—Sabouraudia 1, 103-107.

[Summary in French. Author's abst. modified.] 3907

Orally administered griseofulvin caused *M. canis* infection to disappear from within the hair follicles in artificially infected cats. Clinical evidence of infection disappeared simultaneously although fluorescence persisted. Removal of the distal part of affected hairs in conjunction with the application of an anti-fungal preparation reduced the period of positive fluorescence and of the recovery of the fungus in culture.

—Graham, I. C. (1961). **Study of chinchilla fur chewing.**—NCBA Res. Bull. No. 39. pp. 8. [Middletown, New York: National Chinchilla Breeders of America, Inc.] 3908

Over 1,800 samples of fur obtained from chinchilla farms were cultured for dermatophytes; 76% of samples from fur chewers were positive, compared with 48% from chinchillas sampled at random, and 18% from ranches where fur chewing had not occurred for 2 years. *Trichophyton* was the commonest dermatophyte, followed by *Epidermophyton*, and *Microsporum*. *Aspergillus* was present in almost every sample. Only a few of the chinchillas smeared with culture chewed their fur. It was suggested that ingestion of *Aspergillus* sets up a condition depleting the hair keratin of amino-acids, and this promotes the invasion of the hair by *Trichophyton*. During the past 18 months, griseofulvin in the food has been 100% effective in stopping fur-chewing.—M.G.G.

—Răducănescu, H., Jitaru, G., Poenaru, I. & Stănică, I. (1960). **Frecvența și etiologia leziunilor de tip actinomicotic la bovinele sacrificate în abatorul București.** [Incidence and aetiology of actinomycosis-like lesions in cattle slaughtered in Bucharest.]—Lucr. Inst. Agron. București Ser. C, No. 4 pp. 127-134. [In Roumanian. Summaries in French and Russian.] 3909

Actinomycosis-like lesions were present in 39 of 3,860 cattle slaughtered in Bucharest, but none were found in 300 buffaloes. Actinobacilli were isolated from ganglia, tongue and subcutaneous connective tissue of 97% of affected cattle, and *Actinomyces* was recovered from the bones of 95%. Actinobacilli and actinomyces were sometimes accompanied by staphylococci, streptococci, coliform organisms, pseudomonas, pasteurella, proteus, etc. A small proportion of the lesions contained neither *Actinobacillus* nor *Actinomyces*. Apart from the site of lesions,

differentiation between actinobacillosis and actinomycosis and similar lesions was by culture and microscopically.—E.G.

Phillips, J. E. (1961). **The commensal role of *Actinobacillus lignieresii***.—J. Path. Bact. 82, 205-208. [Author's summary modified.] 3910

Organisms resembling *A. lignieresii* in morphological and biochemical characters were isolated from the ruminal contents of normal cattle. There is an antigenic relationship between these bacteria and pathogenic strains. The recovery of these organisms from normal cattle confirms the hitherto unsupported hypothesis of their commensal nature.

Bedryńska-Dobek, M. (1960). Détermination des caractères morphologiques, culturaux et biochimiques, du pouvoir pathogène et de la résistance aux antibiotiques de 9 souches de *Nocardia asteroides*. [**Properties, pathogenicity and resistance to antibiotics of nine strains of *Nocardia asteroides***.]—Acta microbiol. polon. 9, 343-353. [In French. Summary in Polish.] 3911

The morphological, cultural, and biochemical properties of 9 strains of *N. asteroides* were described. Their pathogenicity for mice varied. They did not form haemolysin *in vitro*. I/v injection of mice with culture supernatant caused no toxic symptoms. Their sensitivity to antibiotics was low; only chloramphenicol, tetracycline, bacitracin and carbomycin had an inhibitory effect on more than one strain, as did high concentrations of streptomycin or isoniazid.—M.G.G.

Karib, E. A. (1961). **Contagious bovine pleuropneumonia in the Sudan**.—Bull. Off. int. Epiz. 56, 900-906. [In English. In French pp. 907-915. Summary in Spanish. Author's summary modified.] 3912

The disease, first recognized in the Sudan in 1912, is the most serious disease in the country, although there has been a considerable regression and three Provinces are completely free.

Control is mainly by large-scale inoculation of Bennett's type of vaccine. In addition there is strict quarantine. Slaughter with payment of compensation has been successfully applied in one district. Attempts are being made to improve the vaccine: special attention is being given to the selection of a suitable culture medium.

Elek, P. & Cottew, G. S. (1961). **Growth of the bovine pleuropneumonia organism *Mycoplasma mycoides* var. *mycoides*, in the embryonated hen egg**.—Aust. vet. J. 37, 163-168. [Authors' summary modified.] 3913

Strain "V5" was cultivated in chick embryos, and maintained in this medium for over 40 passages. With inocula of 10^7 organisms the mean survival time of the embryo was 4-5 days. Yields of 10^8 organisms per ml. were obtained with 6 to 8-day embryos inoculated by the yolk sac route and incubated at 32.2° or 37°C. Titres were higher with incubation at 37° than at 32.2°C. Yield did not depend on size of inoculum and an inoculum of about 2 organisms was usually sufficient to initiate growth in half the embryos. In eggs harvested on the fifth day those with live embryos yielded viable counts of the same order as those with dead embryos. The incubation of harvested egg contents at 37°C. for 2 days increased the viable count up to tenfold.

Litvinov, N. A. (1960). [**Studies on the causal agent of agalactia-like disease of sheep**.]—Trudy Saratov. zootekh.-vet. Inst. 9, 273-291. [In Russian.] 3914

The PPLO isolated from sheep in Saratov [V.B. 31, 3202] differed from the organisms of ovine contagious agalactia and bovine contagious pleuro-pneumonia. It was pleomorphic, but in all forms there was a peripheral cytoplasmic zone that did not take up stains. Electron microscopy revealed elementary bodies. The best medium for isolating the organism was Marten's broth, with horse serum added. The optimum pH for growth was 7.8-8.0. Growth was visible after cultivation of the primary generation for 6-8 days, or 2-3 weeks for subsequent generations. The organism would not grow on solid media. It was pathogenic for rabbits, guinea-pigs and mice.—R.M.

Powelson, D. M. (1961). **Metabolism of animal cells infected with mycoplasma**.—J. Bact. 82, 288-297. [Author's abst. modified.] 3915

PPLO altered the amino-acid metabolism of animal cells. Different strains of animal cells showed different responses to one PPLO strain, and different strains caused different responses in one strain of cells. PPLO did not grow in the tissue culture medium (No. 199 plus 2% horse serum and 20 to 40 units of penicillin/ml.) nor in spent culture fluids. They rapidly died at 37°C. but survived for months at 4°C. The altered metabolism of the

infected tissue cultures appeared to reflect a true host-parasite interaction.

Cumming, R. B. (1961). **Preliminary survey of the incidence of avian PPLO (*Mycoplasma gallinarum*) in an area in Australia.**—*Aust. vet. J.* 37, 221-224. [Author's summary modified.] 3916

A survey of poultry in the Tamworth area of New South Wales using the plate agglutination test revealed that 16 of 17 farms had a high incidence of antibodies to avian pleuropneumonia-like organisms in their flocks. Possibilities of control were discussed.

Adler, H. E., Shifrine, M. & Ortmayer, H. (1961). ***Mycoplasma inocuum* sp. n., a saprophyte from chickens.**—*J. Bact.* 82, 239-240. [Authors' abstr. modified.] 3917

A new species of PPLO was isolated from the infraorbital sinuses of fowls with coryza. The organism was a saprophyte and it differed from all known PPLO of avian origin. It was named *Mycoplasma inocuum*.

Smith, H. Williams & Crabb, W. E. (1961). **The faecal bacterial flora of animals and man: its development in the young.**—*J. Path. Bact.* 82, 53-66. [Authors' summary modified.] 3918

Differential bacterial counts were made on the faeces of calves, lambs, piglets, human babies, and a rabbit at frequent intervals from birth onwards. Throughout the examination period, usually 6-15 months, the bacterial content of the faeces of different animals of

the same species and age was closely similar, irrespective of the animal's breed and environment. The variation that occurred with age was often enormous. For example, the total viable count in calves over 7 months of age was often ten thousand times less than that during the first few weeks of life.

The development of the faecal flora during the early weeks of life was similar in all the species studied, but, as the animals grew older, great differences, particularly of a quantitative nature, appeared between the floras of the different species. *E. coli*, *Cl. welchii* and certain types of streptococci were the first bacteria to be found in large numbers, and they became less numerous as the animals grew older. Lactobacilli and bacteroides were usually a little later in colonizing the intestine, but often persisted in very large numbers for a longer time. Some types of streptococci were also found in the faeces in large numbers over long periods. *Staph. aureus* was never isolated from the faeces of the calves, lambs, piglets and rabbit, but was found at 24 of 58 examinations of the faeces of a human baby.

Differential counts were performed on the faeces of each of 10 adult cattle, sheep, horses, pigs, rabbits, guinea-pigs, mice, dogs, cats, fowls and persons, all 10 animals from each species living in different environments. In general, the results for animals of the same species conformed to a common pattern and this differed markedly from species to species. *Staph. aureus* was found only in human faeces.

See also absts. 4209-4211 (reports, U.K.); 4212-4213 (reports, Nigeria); 4214 (report, Zanzibar); 4215 (book, fungi of India).

DISEASES CAUSED BY PROTOZOAN PARASITES

Nigeria. (1960). **West African Institute for Trypanosomiasis Research. Annual report 1959.** [Willett, K. C.] pp. 54. London: Harrison & Sons Ltd. 3919

A strain of *Trypanosoma gambiense* that has undergone 968 syringe passages in rats in 8 years is now completely monomorphic, kills rats in 2-3 days, and is no longer pathogenic for monkeys. Of 69 tsetse flies that fed on a pig in which no trypanosomes could be found by routine methods, 5 became infected. The infection of *Glossina palpalis* with *T. gambiense* is not affected by the sex of the fly. *G. palpalis* emerging from pupae incubated at 28°C. were often crippled, and those from pupae kept at 20°C. were not readily infected.

Morphological differences between *T.*

dimorphon and *T. congolense* were described. Two strains of *T. dimorphon* were more virulent than 3 strains of *T. congolense* in cattle, sheep and rats. The Vom strain of *T. dimorphon* was of low pathogenicity in a horse. Rises in the serum content of glutamic pyruvic transaminase were found in oxen and sheep with severe parasitaemia. A reedbuck was refractory to *T. vivax*, but the course of infection in a gazelle and a duiker resembled that in sheep; large amounts of β_2 -globulin and γ -globulin appeared in the blood of the exposed wild animals. Precipitating antibodies were demonstrated in animals infected with trypanosomes. The periods of protection given by metamidium compounds in cattle and anticyde compounds in pigs were determined.

Metamidium chloride (3 or 6 mg./kg., s/c) suppressed *T. simiae* parasitaemia in pigs and nucleocidin (0.025 mg./kg., i/m) suppressed *T. vivax* parasitaemia in cattle, but all the animals had a relapse. Trypanosomes resistant to several drugs were often of low pathogenicity to the host in which they were maintained.

G. palpalis was eradicated from 1,500 yards of a stream by spraying only broad-leaved bushes and logs with 4% dieldrin emulsion up to a height of 2-3 feet.—M.G.G.

Robson, J. (1961). Prophylaxis against trypanosomiasis in zebu cattle. II. The duration of prophylaxis conferred by preparations of prothidium compared with antrycide prosalt.—*Vet. Rec.* 73, 641-645. [Author's summary modified.] 3920

Duration of prophylaxis in zebu bulls or bullocks treated with a single dose of Prothidium bromide (powder or tablets) or Prothidium glucoside was compared with that conferred by Antrycide Prosalt R.F. in an area of heavy trypanosome risk.

Prothidium bromide 4 mg. per kg. gave the longest prophylactic effect; at 2 mg. per kg. it gave less protection. Prothidium glucoside at 4 mg. per kg. and Antrycide at 7.4 mg. per kg. both gave poor protection.

No systemic reactions were noted but a high proportion of rupturing of the site of injection occurred in animals treated with Prothidium.

Twenty untreated bullocks introduced at intervals all became infected in 14 to 34 days and 14 died of trypanosomiasis, the others being treated and removed.

Gray, A. R. (1961). Soluble antigens of *Trypanosoma vivax* and of other trypanosomes.—*Immunology* 4, 253-261. [Author's summary modified.] 3921

Precipitins against trypanosomal antigens occurred in serum from zebu cattle which had been infected for prolonged periods with *T. vivax* transmitted by *Glossina morsitans*. Precipitating antisera against *T. vivax* were used to detect complexes of soluble trypanosomal antigens in sera from rats infected with blood-passaged strains of *vivax*, *gambiense* and *brucei* and in sera from goats infected with a cyclically transmitted strain of *vivax*. Antisera contained antibodies which reacted with antigens common to the three species of trypanosomes, and also antibodies which reacted with antigens which may be specific to *T. vivax*.

Ormerod, W. E. (1961). The study of volutin granules in trypanosomes.—*Trans. R. Soc. trop. Med. Hyg.* 55, 313-327. [Author's summary modified.] 3922

Refractile inclusion bodies in trypanosomes, visible by phase contrast microscopy, were called "volutin granules" if they occurred naturally, and "chemotherapy granules" if they were produced by drugs. The relationship between these granules is considered.

Honigberg, B. M. (1961). Comparative pathogenicity of *Trichomonas vaginalis* and *Trichomonas gallinae* to mice. I. Gross pathology, quantitative evaluation of virulence, and some factors affecting pathogenicity.—*J. Parasit.* 47, 545-571. [Abst. from author's summary.] 3923

A statistical comparison of the mean volumes of subcutaneous lesions produced in mice by the several strains of both species reveals that these volumes, which express the degree of pathogenicity of the strains to the experimental hosts, faithfully reflect their relative virulence to the natural hosts. The least virulent strains of the human genital trichomonad are more harmful to mice than the least pathogenic strains of the avian species. Both species become attenuated in their virulence when maintained in culture, more so in *Tr. gallinae* than in *Tr. vaginalis*. The presence of agar in the cultures of strains of both trichomonad species and in the inocula enhances the development of subcutaneous lesions.

Nakamura, M. (1961). Effect of fumagillin in mixed cultures containing *Entamoeba histolytica* and *Trichomonas hominis*.—*J. Parasit.* 47, 368. 3924

Many media for cultivation of *E. histolytica* also allow growth of *Tr. hominis*; elimination of the amoebae to obtain a culture of *Tr. hominis* in such a medium was effected by addition of 10 to 1,000 µg./ml. of fumagillin.—E.V.L.

Hammond, D. M., Clark, W. N. & Miner, M. L. (1961). Endogenous phase of the life cycle of *Eimeria auburnensis* in calves.—*J. Parasit.* 47, 591-596. [Abst. from authors' summary.] 3925

Of 21 young calves inoculated with *E. auburnensis* oocysts, 19 became infected and discharged oocysts for 2 to 7 days, beginning about 18 days after inoculation. The peak number of oocysts usually occurred 19 days after inoculation. Five calves killed 18 to 19

days after inoculation had catarrhal enteritis and eosinophilia. The results indicate that this species is of relatively low pathogenicity.

Microgametocytes, macrogametocytes, and oocysts were found in mesodermal cells in the lamina propria of the villi in the lower small intestine. Early *auburnensis* gametocytes were found in calves killed 15 days after inoculation with *E. bovis* and *E. auburnensis* oocysts, and intermediate stages of gametocytes were seen in calves killed after 16 to 17 days.

McLoughlin, D. K. & Gardiner, J. L. (1961). **Zoalene tolerance by *Eimeria tenella*.** — J. Parasit. 47, No. 4 Sect. 2 p. 46. [Abst. from authors' abst.] 3926

A strain of *E. tenella* not previously exposed to drugs was serially propagated in chickens that initially were fed suboptimal levels of zoalene. During the 12th to 17th passages the birds were fed the chemical at the usual level of 0.0125%. The strain developed tolerance to zoalene. Oocysts of the 17th passage recovered from medicated and unmedicated birds were given to birds fed mash containing nicarbazin, Trithiadol, Unistat, glycarbylamide, arsenosobenzene and nitrofurazone. Only with nitrofurazone was there any indication of cross-resistance by the zoalene-tolerant strain.

Aycardi, J. (1960). I. Activité coccidiostatique d'un complexe sulfate de framycetine menadione bisulphitique. II. Activité coccidiostatique des associations furazolidone-nitrofurazone. [**Coccidiostatic action in fowls of a framycetin-menaphthone complex and of furazolidone combined with nitrofurazone.**] — Ann. Zootech. 9, 209-215 & 217-221. [Summaries in English.] 3927

Efficacy of framycetin (100 g. per metric ton of food) against experimental *E. tenella* infection was improved by adding menaphthone sodium bisulphate at 1 g. per metric ton of food. The best concentration of furazolidone and nitrofurazone was 50 p.p.m. of each in the food.—R.M.

Kantor, S. & Kennett, R. L., Jr. (1961). **The activity of chlortetracycline against *Eimeria acervulina*.**—J. Parasit. 47, No. 4 Sect. 2 pp. 45-46. [Authors' abst. modified.] 3928

Chlortetracycline eliminated or greatly reduced lesions in about one-third of the chicks at 440 to 500 p.p.m. in diets containing 0.4 and 0.8% Ca. Lesions were eliminated from almost all the birds given 880 to 1,000

p.p.m. chlortetracycline in a diet containing 0.8% Ca. Poorer results were obtained when the ration contained 1.4% Ca.

Doran, D. J. & Farr, M. M. (1961). I. **Bacteria-free suspensions of *Eimeria acervulina* sporozoites and the effect of antibiotics on excystation.** II. **In vitro excystation of *Eimeria acervulina*.** — J. Parasit. 47, No. 4 Sect. 2 pp. 34-35 & 45. 3929

Farr, M. M. & Doran, D. J. (1961). **In vivo excystation of *Eimeria acervulina*.** — Ibid. p. 45. [Abst. from authors' absts.] 3930

Bacteria-free suspensions of *E. acervulina* sporozoites were obtained by treating 400,000 to 670,000 oocysts per ml. with a mixture of antibiotics for 4 days, then releasing the sporocysts by aseptic grinding with a mortar and pestle and finally treating with sterile 0.25% trypsin in 5% chicken bile at pH 7.3 to 7.6.

E. acervulina oocysts, sporulated in potassium dichromate and freed from debris by sugar flotation, were inoculated into the crops of chickens 3, 13, and 44 days old. Examination of the birds 10 to 15 min., 25 to 30 min. and 1 hour after inoculation indicated that the oocysts were apparently unchanged in the crop, and a high percentage were broken and their sporocysts released in the gizzard. The sporozoites escaped from the liberated sporocysts in the duodenum and jejunum.

Lotze, J. C. & Leek, R. G. (1961). **A practical method for culturing coccidial oocysts in tap water.** — J. Parasit. 47, 588-590. [Authors' summary modified.] 3931

For preparing and sporulating ovine coccidia in large batches, oocyst-bearing material is freed from the larger solid particles through screening and from water-soluble substances by thorough washings, after which it is placed in defined amounts in tap water in shallow dishes.

Al-Dabagh, M. A. (1961). **Eyelid lesions in chicks infected with *Plasmodium gallinaceum*.** — Trans. R. Soc. trop. Med. Hyg. 55, 351-354. [Author's conclusions modified.] 3932

Chicks with severe acute *Pl. gallinaceum* infections may develop eyelid lesions, very similar to those described in pantothenic acid deficiency in chicks.

Al-Dabagh, M. A. (1961). **Symptomatic partial paralysis in chicks infected with *Plasmodium juxtanucleare*.**—J. comp. Path. 71, 217-221. [Author's conclusions modified.] 3933

Partial symptomatic paralysis observed in 10 out of 148 chicks infected with the plasmodium may be due to the severe necrotic and inflammatory lesions observed in the brain and spinal cord.

Kirshnamurti, P. V., Peardon, D. L., Todd, A. C. & McGibbon, W. H. (1961). **A blood parasite from chickens in Wisconsin.** — J. Parasit. 47, No. 4 Sect. 2 p. 44. [Authors' abst. modified.] 3934

A parasite was observed inside erythrocytes in a blood smear from a laying pullet. There were between 1 and 3 parasites per 3,000 red blood corpuscles. When blood was transfused to 3-week-old chickens, the initial parasitic forms appeared in erythrocytes in peripheral blood 8 to 12 days later. The parasites multiplied between the 10th and 25th days, and different forms (apparently including trophozoites, schizonts and gametocytes) were observed. The infection has been maintained by passage. The parasite appeared to be a *Plasmodium*; the species has not been established.

Clarkson, M. J. (1961). **The blood supply of the liver of the turkey and the anatomy of the biliary tract with reference to infection with *Histomonas meleagridis*.** — Res. vet. Sci. 2, 259-264. [Author's summary modified.] 3935

The right and left hepatic arteries are derived from different branches of the coeliac artery. The hepatic portal system consists of a large right portal vein from the intestines and spleen and small left portal veins from the gizzard and proventriculus. The right portal vein connects with the renal portal system by the coccygeo-mesenteric and hypogastric veins. The two bile ducts are joined within the substance of the liver.

C. discussed these findings in relation to the pathogenesis of histomoniasis.

Shone, D. K., Wells, G. E. & Waller, F. J. A. (1961). **The activity of amicarbalide against *Babesia bigemina*.** — Vet. Rec. 73, 736-739 & 740. [Authors' summary modified.] 3936

Amicarbalide (3:3'-diamidino-carbanilide) administered s/c or i/m at the rate of 10 mg. per kg. had better action against *Babesia bigemina* than phenamidine isethionate. Local tolerance by deep i/m inj. is good and systemic tolerance is also good. Severe local reactions resulted when 50 w/v solution was given by s/c inj.

Shone, D. K. & Philip, J. R. (1960). **The susceptibility of the African bush pig, *Potamochoerus porcus maschona*, Lonnberg, to infection with *Babesia trautmanni*.** — J. S. Afr. vet. med. Ass. 31, 451-453. [Authors' summary modified.] 3937

The African bush pig could harbour *B. trautmanni* for 16 days, and for a further 8 days after splenectomy. The infection was inapparent. Numerous *Rhipicephalus simus* and one *Rh. appendiculatus* were collected from domestic sows during an outbreak of piroplasmiasis.

The incubation period in domestic pigs following s/c inj. of infected blood was 4 to 6 days.

Brocklesby, D. W. & Vidler, B. O. (1961). **Attempts to infect some small laboratory animals with *Theileria parva*.** — Res. vet. Sci. 2, 285-287. [Authors' summary modified.] 3938

Attempts to infect hamsters, rabbits, multimammate rats and unstriped grass mice with *Th. parva* were unsuccessful.

Bray, R. S. & Garnham, P. C. C. (1961). **Failure to infect splenectomized primates with *Theileria parva*.** — J. Parasit. 47, 538. 3939

The protozoan did not become established in two chimpanzees and three monkeys (all splenectomized) after infected *Rhipicephalus appendiculatus* ticks had fed on them.—R.M.

Mandoul, R., Dargelos, R. & Millan, J. (1961). **Destruction des protozoaires intestinaux de la souris par un dérivé nitré de l'imidazole. [Destruction of intestinal protozoa in mice by metronidazole.]** — Bull. Soc. Pat. exot. 54, 12-16. [Summary in English.] 3940

The drug cured *Giardia*, *Trichomonas* and *Entamoeba* infections in mice. It was administered in the drinking water for 11 days at a daily dose of 266 mg./kg. body wt. This dosage was not toxic for mice.—R.M.

Moulton, J. E., Heuschele, W. P. & Sheridan, B. W. (1961). **Balantidiasis in the capybara.** — Cornell Vet. 51, 350-358. [Authors' summary modified.] 3941

The clinical and pathological features of *Balantidium coli* infection in six capybaras [*Hydrochoerus capybara*] were described. The principal lesion was ulceration of the colon.

DISEASES CAUSED BY VIRUSES AND RICKETTSIA

Brown, F., Planterose, D. N. & Stewart, D. L. (1961). **Effect of p-fluorophenylalanine on the multiplication of foot-and-mouth disease virus.**—*Nature, Lond.* 191, 414-415. 3942

The yield of F. & M. disease virus and viral ribonucleic acid in pig kidney tissue culture decreased as the concentration of p-fluorophenylalanine added to the medium increased. Addition of 1,000 micro-moles, even immediately before the maturation stage, led within 20 min. to complete inhibition of the syntheses of virus and infective nucleic acid. It appears that the synthesis of the infective nucleic acid of F. & M. disease virus is intimately related to the continuous synthesis of protein.—M.G.G.

Schwöbel, W. (1961). Die Bildung von Plaques durch das Virus der Maul- und Klauenseuche unter methylcellulose-haltigen Medien. [**Formation of plaques by the virus of foot and mouth disease under media containing methylcellulose.**]—*Z. Naturf.* 14b, 479-480. 3943

Plaque formation is usually observed in infected cell layers covered by agar. Instead of agar, a nutrient medium made viscous by adding methylcellulose could be employed, and this method had certain advantages.—R.M.

I. Mašić, M. (1961). [**Modes of infection of cattle with Aujeszky's disease.**]—*Acta vet., Belgrade* 11, 49-54. 3944

II. Mašić, M. & Petrović, M. (1961). [**Failure to transmit Aujeszky's disease by lice.**]—*Ibid.* 79-84. [In Serbian. Summaries in German.] 3945

I. Young cattle, housed together with rabbits, pigs or cattle which had been experimentally infected with Aujeszky's virus, failed to develop the disease. They resisted intranasal instillation or i/m inj. of a dose of 10^{-3} of virus, but one animal given an i/m dose of 10^{-1} of virus developed the disease. The latent form, as often seen in pigs, does not appear to occur in cattle. Despite the relatively high incidence of the disease in pigs in the Vojvodina district of Yugoslavia, Aujeszky's disease does not appear to constitute a potential danger to the cattle population.

II. The authors failed to infect mice by intracerebral and rabbits by i/m inj. of a suspension prepared from lice (*Haemotopinus suis*), which had fed for 4-6 days on experimentally infected pigs.—E.G.

Hebert, H. J. & Humphrey, G. L. (1961). **Rabies outbreak in Imperial County.**—*Publ. Hlth Rep. Wash.* 76, 391-397. 3946

A severe outbreak in the U.S.A. was believed to have spread from local predatory animals; control measures included the setting-up of 188 poison bait stations, destruction of 4,259 stray dogs and vaccination of 29,867 animals.—E.V.L.

Vaughan, J. B. & Gerhardt, P. (1961). **Isolation of Flury rabies vaccine virus from the salivary gland of a cat.**—*J. Amer. vet. med. Ass.* 139, 221-223. [Authors' summary modified.] 3947

Rabies virus was isolated from the sub-maxillary salivary glands of a cat which died following vaccination with low egg passage Flury rabies vaccine. The case history and experiments on dogs, rabbits, hamsters, g.pigs, and chick embryos suggested that the agent isolated was the vaccine strain.

Powell, H. M. & Culbertson, C. G. (1959). **Inactivation of fixed rabies virus, grown on embryonated duck eggs, by means of beta propiolactone.**—*Sthwest. Vet.* 12, 281-285. [Authors' summary modified.] 3948

Preparation of pooled batches of duck-embryo fixed rabies virus and its inactivation by beta-propiolactone were described.

Such completely inactivated virus proved to be an effective antirabies vaccine, free from side reactions peculiar to brain vaccine.

Thiéry, G. (1960). Considérations théoriques et pratiques sur un traitement curatif de la rage déclarée. [**Curative treatment of clinical rabies.**]—*C.R. Acad. Sci., Paris* 252, 4219-4220. 3949

The author's treatment was based on the theory that a convulsive electric shock liberated rabies virus from nerve cells, so that it could be neutralized by rabies antibodies circulating in the blood. Experiments were done on laboratory animals and on Gambian rats (*Cricetomys gambianus*) infected with street virus. To cure rabies three shocks each producing unconsciousness for 5 min. had to be given daily for 12 days, while simultaneously massive doses of rabies hyper-immune serum were injected.—R.M.

Zebrowski, L., Smith, K. O. & Sharp, D. G. (1961). **Staining of vaccinia-infected L cells**

with brilliant cresyl blue.—J. Immunol. 87, 228-231. [Authors' summary modified.] 3950

Although nearly all normal L cells in cultures 3 to 5 days old are stained by brilliant cresyl blue, cells infected with vaccinia virus tend to remain unstained. This tendency may develop 2 hours after infection and it increased to involve most of the cells after 2 or 3 days of incubation.

Sellers, T. F., Jr., Schulman, J., Bouvier, C., McCune, R. & Kilbourne, E. D. (1961). **The influence of influenza virus infection on exogenous staphylococcal and endogenous murine bacterial infection of the bronchopulmonary tissues of mice.** — J. exp. Med. 114, 237-256. [Authors' summary modified.] 3951

Mice infected with influenza A virus were less able to destroy or remove staphylococci introduced by the respiratory route. This temporary inhibition of local defence mechanisms lasted 7 to 10 days.

Persistence of staphylococci in the lung following influenza did not appear to alter the nature of the pathological reaction to influenza virus. Presence of influenza virus in the respiratory tract did not alter the fate of intravenously injected staphylococci in the lung or other organs. Half the mice with influenza had purulent bronchopneumonia and infection with *Pasteurella* and *Haemophilus*. Only a few control animals had such infections.

Drescher, J. (1961). **Comparison of the adsorption of influenza virus strain B/Berlin/2/55 on aluminium oxide and on aluminium hydroxide.** — Amer. J. Hyg. 74, 104-118. [Abst. from author's summary.] 3952

Aluminium hydroxide was found to adsorb more virus per mol than aluminium oxide did under the same experimental conditions. The adsorption on aluminium oxide was found to be uniform. The adsorption on aluminium hydroxide lacked uniformity; no adsorption isotherm could be established.

I. Casals, J. (1961). **Procedures for identification of arthropod-borne viruses.** — Bull. World Hlth Org. 24, 723-734. 3953

II. Porterfield, J. S. (1961). **Cross-neutralization studies with group A arthropod-borne viruses.**—Bull. World Hlth Org. 24, 735-741. [Summaries in French. Authors' summaries modified.] 3954

I. Certain steps are advisable in the identification of an arthropod-borne virus. (1) Determination of the arthropod-borne

nature of the virus. (2) Determination of the antigenic group. For this are used hyper-immune sera with considerable cross-reactivity within the group. (3) Determination of type within the group, using simple immune sera.

Viruses that belong in minor groups or are ungrouped often constitute a problem because, once the major groups have been eliminated, comparative studies must be conducted with practically all the remaining viruses before a definitive answer is reached.

II. The plaque-inhibition test was applied to 15 group A strains. Middelburg and Eastern equine encephalomyelitis viruses show no relationship to any other virus in the group. Sindbis and Western equine encephalomyelitis viruses show a one-way relationship only. The remaining viruses all share some antigenic components which react with hyperimmune rabbit sera prepared against Semliki Forest virus. By using single-dose rabbit sera, or more specific mouse-immune sera, four distinct subgroups can be defined. One includes Semliki Forest virus strains; another Chikungunya virus and its substrains, Vereeniging and TH 35 viruses; the third contains O'nyong-nyong virus; and the fourth Mayaro and Uruma viruses. The plaque-inhibition technique can also be used for the rapid identification of new virus isolates.

Lowenthal, J. P., Berman, S. & Grogan, E. W. (1961). **Eastern equine encephalomyelitis vaccine prepared in cell cultures.** — Science 134, 565-566. [Authors' abst. modified.] 3955

Protection tests in g.pigs indicate that vaccines prepared from virus propagated in chick embryo cell cultures are as effective as the purified whole chick-embryo vaccines which are currently used for human immunization against Eastern equine encephalomyelitis.

Littlejohns, I. R., Harris, A. N. A. & Harding, W. B. (1961). **Sporadic bovine encephalomyelitis.**—Aust. vet. J. 37, 53. 3956

A report is made of a disease, recognized in New South Wales for over 30 years, which is similar to or identical with sporadic bovine encephalomyelitis. It has been described as an "ephemeral fever-like disease" [*V.B.* 16, 439] and more recently as a transmissible serositis. Points of difference between the conditions are listed.—A. G. CULEY.

Kniazeff, A. J., Huck, R. A., Jarrett, W. F. H., Pritchard, W. R., Ramsey, F. K., Schipper, I. A., Stober, M. & Liess, B. (1961). **Anti-**

genic relationship of some bovine viral diarrhoea-mucosal disease viruses from the United States, Great Britain, and West Germany.—Vet. Rec. 73, 768-769. 3957

This is a short paper by joint authors from the U.S.A., Great Britain and Federal Germany, on preliminary serum neutralization studies to establish the antigenic relationship between agents of the virus diarrhoea-mucosal disease group, isolated in the countries stated. An antigenic relationship was found between virus diarrhoea Oregon (C24V) virus and the following viruses of the group: New York (NY-1), Iowa (Saunders), North Dakota (BMD), Indiana (MD-1), England (LS), Scotland (GPB) and West Germany (Lamspringe-60).—E.G.

Trapp, A. L. (1960). **Pathology of the blood-vascular and lymphatic systems of cattle affected with mucosal disease.**—Dissertation, Iowa pp. 157. [Abst. from Diss. Abstr. 21, 2252 (1961).] 3958

T. studied the cardiovascular and haematopoietic systems of 64 cattle with mucosal disease, and also the haematology of 50 cases.

In lymph nodes there was severe depletion in the number of small lymphocytes and a reduction in the number of mitotic figures observed. Occasionally there was severe coagulative necrosis in the cortex of the mesenteric lymph nodes. Lesions were always severe in the mesenteric lymph nodes, and also (in order of decreasing severity) in suprathyroid, bronchial, prescapular, parotid and prefemoral nodes. The same type of lesions was present in spleen and haemal nodes. In spleen there were also increases in haemosiderin, neutrophils and eosinophils in the periphery of the lymphatic nodules.

The main alteration in tonsils and thymus was a decrease in the number of thymocytes or small lymphocytes. An apparent increase in the number of Hassall's corpuscles was also observed in the thymus. Lesions in Peyer's patches ranged from depletion of lymphocytes to coagulative and liquefactive necrosis of the lymphatic tissue. Lesions attributable to mucosal disease were not observed in sections of the cardiovascular system.

In the later stages of the disease there were increases in erythrocyte count, haemoglobin concentration, haematocrit value, blood urea nitrogen level, blood sugar, and a decrease in total blood volume.

In most cases total leucocyte counts were

normal or elevated but in a few cases a leucopenia was noted. Differential leucocyte counts revealed lymphopenia and neutrophilia. An apparent myeloid hyperplasia of the bone marrow with a predominance of neutrophilic cells was observed in many animals.

Zuschek, F. & Chow, T. L. (1961). **Immunogenicity of 2 infectious bovine rhinotracheitis vaccines.**—J. Amer. vet. med. Ass. 139, 236-237. [Authors' summary.] 3959

Two types of vaccine for infectious bovine rhinotracheitis, a tissue culture-modified live-virus vaccine and a formalin-killed-virus vaccine, produced sufficient immunity in cattle to protect against subsequent challenge with virulent live virus.

Bögel, K. (1961). **Virologische Untersuchungsbefunde bei Kälbern mit respiratorischem Syndrom unter besonderer Berücksichtigung der Parainfluenza-3-Virusinfektion. [Virological research in calves with respiratory syndrome, with special reference to infection with para-influenza 3 myxovirus.]**—Mh. Tierheilk. 13, 129-135 & 162-174. 3960

A strain of para-influenza 3 isolated from the noses of three sick calves produced respiratory disease histologically similar to virus pneumonia in a calf aged 4½ weeks; the virus was recovered from the lung tissue. Mild tracheobronchitis was also produced experimentally by the strain in 6 calves about 5 months old.—E.V.L.

Ketler, A., Hamparian, V. V. & Hilleman, M. R. (1961). **Laboratory and field investigations of bovine myxovirus parainfluenza 3 virus and vaccine. I. Properties of the SF-4 (shipping fever) strain of virus.**—J. Immunol. 87, 126-133. 3961

McClelland, L., Hampil, B., Hamparian, V. V., Potash, L., Ketler, A. & Hilleman, M. R. (1961). **Laboratory and field investigations of bovine myxovirus parainfluenza 3 virus and vaccine. II. Development and appraisal of potency of SF-4 (shipping fever) virus vaccine.**—Ibid. 134-138. 3962

Hamparian, V. V., Washko, F. V., Ketler, A. & Hilleman, M. R. (1961). **Laboratory and field investigations of bovine myxovirus parainfluenza 3 virus and vaccine. III. Evaluation of an SF-4 (shipping fever) virus vaccine in cattle.**—Ibid. 139-146. 3963

The authors discussed the possible role of para-influenza 3 virus in "shipping fever". They developed a formaldehyde-killed virus vaccine using the SF-4 strain of the virus

propagated in cell cultures of bovine kidney. Such vaccine when incorporated into an emulsified mineral-oil adjuvant proved highly potent for stimulating antibody response in cattle.

Efficacy of the vaccine was evaluated in terms of antibody response in cattle and with regard to prevention of experimental infection with the virus. Evidence was presented to indicate spread, under field conditions, of para-influenza 3 virus infections without clinically recognizable illness.—R.M.

McFerran, J. B. (1961). **Some properties of a bovine enterovirus.**—Res. vet. Sci. 2, 185-192. [Author's summary modified.] 3964

A virus isolated from the faeces of a normal calf and designated VG(5)27 was antigenically similar to the LC R4 virus isolated in the U.S.A. by Kunin & Minuse (1958). The virus measured approximately 23 m μ , and was relatively thermostable. It was not inactivated by ether or by the chloroxylenol type of disinfectant, but was rapidly inactivated by disinfectants containing chlorine, and by formalin. It was not susceptible to variations in pH. It did not cause lesions or death in laboratory animals.

Ross, C. A. C. (1961). **Louping-ill in the West of Scotland.**—Lancet, September 2nd pp. 527-528. [Author's summary modified.] 3965

Sera from 408 patients in the west of Scotland suffering from either aseptic meningitis, encephalitis, or meningo-encephalitis, or from "paralytic poliomyelitis", during 1959-60 were examined for louping-ill antibodies by complement fixation using a mouse brain antigen. Only one patient, a sheep farmer with meningoencephalitis, showed evidence of louping-ill infection. During the period of study, louping-ill was a serious disease of sheep in part of this area. Thus it appears that in Scotland natural infection of man with involvement of the central nervous system is rare.

Kumagai, T., Shimizu, T. Ikeda, S. & Matumoto, M. (1961). **A new in vitro method (END) for detection and measurement of hog cholera virus and its antibody by means of effect of HC virus on Newcastle disease virus in swine tissue culture. I. Establishment of standard procedure.**—J. Immunol. 87, 245-256. 3966

Matumoto, M., Kumagai, T., Shimizu, T. & Ikeda, S. (1961). **A new in vitro method (END) for detection and measurement of**

hog cholera virus and its antibody by means of effect of HC virus on Newcastle disease virus in swine tissue culture. II. Some characteristics of END method.—Ibid. 257-268. [Authors' summaries modified.] 3967

I. This method is based on the findings that, under certain experimental conditions, Newcastle disease virus exerts no cytopathic effect when inoculated into swine testicular cell monolayer cultures within 4 or 5 days of cultivation, whereas Newcastle disease virus produces cytopathic changes when inoculated into the same culture after 6 to 8 days of cultivation, and that in cell cultures infected in the initial stage of cultivation with swine fever virus (which is not cytopathic) Newcastle disease virus readily produces marked cytopathic effects even if it is inoculated as early as the second, third, or fourth day of cell cultivation. Various factors involved in the phenomenon were investigated and a standard method of procedure was established.

II. The method was successfully employed for titrating swine fever virus with highly reproducible results. The sensitivity of the method appeared to be somewhat lower than the ordinary swine inoculation method, but this disadvantage was overcome by an intermediary passage of the viral material to be tested in swine spleen culture. All the laboratory strains of virus so far tested were capable of producing this phenomenon, except the Lederle live vaccine strain, whereas various swine materials not containing the virus invariably failed to produce the phenomenon. The method appeared to be as effective as swine inoculation for detecting swine fever virus in naturally infected pigs. It was also applied to the detection and measurement of neutralizing antibodies. The mechanism of the phenomenon was discussed and it was concluded that this was an example of virus exaltation.

Hecke, F. (1961). **Untersuchungen über die Vermehrung des Virus der ansteckenden Schweinelähmung (Teschener Krankheit) im Verdauungstrakt. [Proliferation of the virus of Teschen disease in the digestive tract of pigs.]**—Zbl. Bakt. I. (Orig.) 182, 142-158. [Summaries in English, French, Spanish and Russian.] 3968

In pigs fed culture of Teschen disease virus, viral titres of over 10^{-5} were found in the faeces. Excretion of the virus lasted for at least 5 weeks and was accompanied by the

development of serological titres. The virus appears to grow mainly within the epithelium of the colon. The degree of proliferation seems to have no pathogenic significance.

—M.G.G.

Betts, A. O., Kelly, D. F., Lamont, P. H. & Sheffy, B. E. (1961). **The isolation and characterisation of some enteroviruses from pigs.** — Vet. Rec. 73, 752-754 & 755. [Authors' summary modified.] 3969

It is suggested that the following 4 criteria should be fulfilled before a virus is termed a porcine enterovirus. It should be: (1) small (30 to 40 m μ); (2) resistant to ether; (3) capable of multiplying in the alimentary tract of the pig; (4) cytopathic for porcine kidney tissue cultures. The authors isolated a number of cytopathic agents from faeces of pigs. Some of these, together with the viruses of Teschen and Talfan diseases and the T80, T52A, F52 and V13 viruses, satisfied the 4 criteria and were divided into at least 9 groups by cross-neutralization tests in tissue cultures.

Bittle, J. L., York, C. J. & Newberne, J. W. (1961). **Adaptation and modification of a strain of canine distemper virus in tissue culture.**—Cornell Vet. 51, 359-369. [Authors' summary modified.] 3970

A virulent strain of canine distemper virus was adapted to canine kidney tissue culture. The time required for this virus to produce cytopathic changes was gradually reduced from 18 days in the initial isolation to 9 days by the 21st passage, after which no further reduction occurred. Cytoplasmic inclusions were demonstrated in stained preparations well before a cytopathic effect became evident. The virus was also modified from the virulent to a practically avirulent form; with 20th and 21st tissue culture passage material it produced an antibody response but no clinical signs of disease in inoculated dogs and did not spread to contact controls.

Ablett, R. E., Baker, L. A. & Holmes, J. W. H. (1961). **Isolation of the canine hepatitis virus from a sucking puppy.**—Vet. Rec. 73, 616-617 & 618. 3971

A bitch with a serum neutralization titre of 1:1,280 to canine hepatitis virus gave birth to 8 puppies, 4 of which died within 3 days. The virus was isolated from a suspension of liver, kidney and mesenteric lymph node tissues from one of the dead puppies. The

filtered suspension was injected i/p into 4 dogs, 2 of which had been immunized against virus hepatitis. These 2 remained normal, the third died in 5 days with numerous nuclear inclusions in the liver and kidney, and the fourth, destroyed on the 12th day, had a high titre to the virus, and focal interstitial nephritis.—M.G.G.

White, G., Simpson, R. M. & Scott, G. R. (1961). **An antigenic relationship between the viruses of bovine rinderpest and canine distemper.** — Immunology 4, 203-205. [Authors' summary modified.] 3972

A close but not complete antigenic relationship between the viruses of rinderpest and distemper was illustrated by gel-diffusion techniques.

Carmichael, L. E. & Barnes, F. D. (1961). **Serological comparisons between infectious canine hepatitis virus and human adenovirus types.** — Proc. Soc. exp. Biol. N.Y. 107, 214-218. [Authors' summary modified.] 3973

Antigenic relationships between infectious canine hepatitis virus (CH) and certain human adenoviruses were confirmed by complement-fixation, indirect haemagglutination and gel-diffusion precipitin tests. The serological relationship was unilateral, since antisera against human adenoviruses react in various tests with CH antigen, while specific antisera to CH failed to react with group-reactive human adenovirus antigens (types 2 and 4). There was no specific cross-neutralization between CH and the adenovirus types examined. Certain biological properties shared by the canine and the human adenoviruses were compared, and these suggest that CH should be included taxonomically within the adenovirus group.

Wemmenhove, R. & Jansen, J. (1961). **De incubatietijd der myxomatosis. [The incubation period of myxomatosis.]**—Tijdschr. Diergeneesk. 86, 1183-1191. [In Dutch Summaries in English, French, German and Spanish. Abst. from English summary.] 3974

The virus described in this paper had a period of incubation between 7 and 10 days but in most cases it was 9 days. Rabbits placed in infected boxes did not contract the disease, except when they were in contact with diseased rabbits. The authors were successful in reproducing the disease by puncturing the skin of a rabbit with a thin infected needle (imitating the bite of an insect).

Kraft, L. M. (1961). **Responses of the mouse to the virus of epidemic diarrhea of infant mice. Neutralizing antibodies and carrier state.**—Proc. Anim. Care Panel 11, 125-136. [Authors' abst. modified.] 3975

The sera of mice having had one contact with epidemic diarrhoea virus were incapable of neutralizing significant amounts of the virus. Sera from mice having lifelong contact with the agent were more apt to neutralize the virus. Adults can be intestinal carriers for at least 17 days after a single exposure to the virus. Litters of previously infected primiparae are almost as susceptible to the agent as are litters of normal dams.

Bauer, D. J. & Sadler, P. W. (1961). **Derivatives of isatin beta-thiosemicarbazone with anti-viral chemotherapeutic activity against ectromelia infection.**—Nature, Lond. 190, 1167-1169. 3976

Isatin- β -thiosemicarbazone has anti-viral activity in mice infected intracerebrally with vaccinia, but not in mice infected with ectromelia; suggesting that the compound acts against the virus rather than against the host cell. Modification of the molecule has given derivatives with high activity against ectromelia and little or none against vaccinia. These compounds are all 4':4"-dialkylthiosemicarbazones of isatin with N-methylisatin or N-ethylisatin; further modifications may lead to activity against other viruses.—E.V.L.

Soave, O. A. & van Allen, A. (1958). **Lymphocytic choriomeningitis in a mouse breeding colony**—Proc. Anim. Care Panel 8, 135-140. [Authors' summary modified.] 3977

The symptoms, pathology, epidemiology and control of lymphocytic choriomeningitis are discussed. An outbreak in a mouse breeding colony is reported and some of the implications of latent viral infections for experimental pathology are outlined.

McLean, D. M., Walker, S. J., MacPherson, L. W., Scholten, T. H., Ronald, K., Wyllie, J. C. & McQueen, E. J. (1961). **Powassan virus: investigations of possible natural cycles of infection.**—J. infect. Dis. 109, 19-23. [Authors' summary.] 3978

During 1959 and 1960 neutralizing antibody to Powassan virus was detected in serums from 5 of 23 chipmunks and 2 of 14 squirrels captured near Powassan, Ontario. No antibody was detected in 17 snowshoe hares despite heavy infestation with the tick *Haemaphysalis leporis palustris*.

On Manitoulin Island during 1960, neutralizing antibody to Powassan virus was detected in serums from 5 of 178 snowshoe hares, 2 of 16 chipmunks, and 2 of 45 squirrels, suggesting that all these species may be reservoirs of virus. No vector of Powassan virus between wildlife and man has been incriminated as yet. Isolation of previously unrecognised viruses from 2 pools of *H. leporis palustris* removed from 4 hares suggests that this species may be a vector in natural cycles of infection with these viruses in ticks and snowshoe hares.

Halstead, S. B. & Buescher, E. L. (1961). **Hemorrhagic disease in rodents infected with virus associated with Thai hemorrhagic fever.**—Science 134, 475-476. [Authors' abst. modified.] 3979

A virus recovered from a child with Thailand haemorrhagic fever produces in infant mouse, rat, and hamster a disease that is characterized by spontaneous bleeding at multiple sites, notably in the gastro-intestinal tract, and by severe abnormalities in haemostatic mechanisms. This virus differs in this respect from Chikungunya virus to which it is immunologically similar and from other Thai haemorrhagic fever viruses.

Johnston, P. B. (1961). **A second immunologic type of simian foamy virus: monkey throat infections and unmasking by both types.**—J. infect. Dis. 109, 1-9. [Author's summary modified.] 3980

Fourteen strains of a new group of simian foamy virus were isolated from Taiwan and Philippine monkeys and designated type 2. These and the original type 1 strains were frequently recovered from kidneys and throat swabs of apparently healthy monkeys. Thirty-eight out of 104 throats were positive, including 24 type 1 strains and 12 type 2. Usually virus could not be recovered by inoculating rabbit kidney monolayer cultures with kidney suspension, but by "unmasking" of kidney cultures 26 strains were recovered from 47 monkeys.

Bankowski, R. A. (1961). **A study of asymptomatic Newcastle disease in a breeding flock.**—Res. vet. Sci. 2, 193-201. [Author's summary.] 3981

An asymptomatic form of Newcastle disease which was diagnosed by chance by means of the haemagglutination inhibition test is described. No evidence of transmission of the virus was found following contact

exposure of susceptible chickens for as long as 179 days to asymptomatic but infected birds. Newcastle disease virus could not be isolated from serologically reacting chickens, from embryos of eggs laid by the hens, or from the progeny of the breeding flock.

Gale, C., McCartney, M. G. & Sanger, V. L. (1961). **Newcastle disease in turkeys.**—J. Amer. vet. med. Ass. 139, 462-465. [Authors' summary modified] 3982

Newcastle disease virus was isolated from a flock of 1,048 turkey hens. The only signs of disease were mild respiratory disorders. There was a big fall in egg production and most of the eggs were soft-shelled, misshapen and lacked pigment.

Neuronal degeneration was found in the cerebrum, brain stem, and cerebellum. Respiratory lesions were extensive. Affected birds had HI titres to N.D.

Reuss, U. (1961). Die Empfänglichkeit der Haustauben für die atypische Geflügelpest. [Susceptibility of pigeons to Newcastle disease.]—Mh. Tierheilk. 13, 153-162. 3983

The author investigated the susceptibility of pigeons to both experimental and natural contact infection with Newcastle disease. Oral infection of pigeons with doses fatal to fowls rarely produced clinical disease, whereas i/m and i/v infection was usually fatal. These birds excreted the virus and could thus infect fowls. Pigeons kept in contact with fowls in natural conditions were resistant to infection and it was concluded that pigeons do not spread the disease from infected flocks. —E.V.L.

I. Read, J. (1961). **The control of Newcastle disease in Great Britain.**—Brit. vet. J. 117, 275-288. 3984

II. Hoekstra, J. (1961). **Control of Newcastle disease and infectious bronchitis by vaccination.**—Ibid. 289-295. [Authors' summaries modified.] 3985

I. An historical survey of Newcastle disease in Gt. Britain since its first recognition by Doyle in 1926 is given. As a result of recent trends in the expansion of the broiler industry the control of the disease has presented considerable difficulty in certain areas, notably East Anglia, and the slaughter policy is at present under review by a Committee of Inquiry.

II. An attempt to eradicate Newcastle disease in the Netherlands by official control methods failed. The paper describes the

subsequent policy adopted, in which a live virus vaccine (Hitchner B₁ strain) is administered in the drinking water. Provided the vaccine was applied at three-monthly intervals, excellent protection was obtained.

One infectious bronchitis vaccine is prepared from a Dutch field strain of the virus attenuated by some 50 egg passages. Its use is restricted to fowls aged 3-4 months. For young chicks and for laying fowls a milder vaccine produced by further repeated egg passages of the same strain is used.

A combined Newcastle disease/infectious bronchitis vaccine was as effective as either vaccine given separately, but the combination is not entirely free from hazard and the advantages and disadvantages of a combined vaccine are discussed.

Mansjoer, M. (1961). **Newcastle disease in Indonesia. Part I. Its present situation, epizootiology and combat.**—Commun. vet., Bogor 5, 1-15. 3986

Ressang, A. A. (1961). **Newcastle disease in Indonesia. Part II. Its symptomatology, gross and microscopic anatomy.**—Ibid. 16-37. [In English. Summary in Indonesian.] 3987

I. Newcastle disease was first recorded in Indonesia in 1926. Economic losses inflicted by the disease are considerable. Mortality is between 30-40%. Human infection has been observed. Dissemination in poultry by air-borne virus, food, faeces, immunized or subclinically infected birds, wild animals, human beings, etc., was discussed. Satisfactory results were obtained with a whole-egg vaccine of virus passaged in wild doves (*Geophelia striata striata*). The use of live vaccines by unskilled persons is forbidden. Import restrictions on poultry and use of killed vaccines for juvenile birds were advocated. Pilot poultry disease control schemes in every veterinary district were recommended.

II. In Indonesia, as in Europe, the character of Newcastle disease is mainly enteritic as compared with the pneumo-encephalitic nature of the disease in North America. Inflammatory lesions were seldom present in nerve tissue: the main lesions included vascular congestion, degenerative changes in neurones and occasional cerebral haemorrhages, necrosis or perivascular cuffing. Laryngo-pharyngitis, intestinal necrosis and proventricular haemorrhages were considered

of greater diagnostic value than examination of the c.n.s.—E.G.

Wachendörfer, G. (1961). Die Präzipitation im Agargel zur Identifizierung des Newcastle-Virus, nebst Versuchen zur Abgrenzung des Hitchner B₁-Virus von velogenen Newcastle-Stämmen. [**The gel diffusion test for Newcastle disease and attempts to differentiate between strains of low and high virulence.**]—Dtsch. tierärztl. Wschr. **68**, 382-384. [Summary in English.] **3988**

In the gel diffusion test, precipitins were demonstrated in the blood of fowls naturally infected with Newcastle disease or hyper-immunized i/m with live avirulent virus (Hitchner B₁ strain), but not in fowls given adsorbed vaccine nor in chicks given the avirulent virus in the drinking water. The test did not distinguish between strains of high and low virulence.—M.G.G.

Petek, M. & Quaglio, G. (1960). Virus Fahey-Crawley e virus A37020 di Sumner e Coll.: studio comparativo sperimentale di due virus neurotropi aviari. [**Comparative study of two neurotropic viruses of fowls.**]—Atti Soc. ital. Sci. vet. **14**, 598-604. [Summaries in English and German.] **3989**

The virus isolated from chronic respiratory disease by Fahey & Crawley [*V.B.* **24**, 2367] was compared with egg-adapted avian encephalomyelitis virus isolated by Sumner & colleagues [*V.B.* **28**, 2877]. The first produced nervous symptoms in 46% of infected day-old chicks and 20% died, whereas the second produced nervous symptoms in 73% and 46% died. Both viruses were resistant to ether, chloroform and heat, and there was some cross-immunity in neutralization tests.—R.M.

Carnaghan, R. B. A. (1961). **Egg transmission of infectious synovitis.**—J.comp. Path. **71**, 279-285. [Author's conclusions.] **3990**

An account is given of an outbreak of infectious synovitis in laying pullets and the subsequent isolation of the infective agent from 6 per cent of embryos and a single chick hatched from an egg produced by the clinically normal survivors of the disease.

The disease was successfully transmitted to adult fowls in the laboratory and the causal agent was isolated from embryos dying during incubation and from chicks hatched from eggs produced by the survivors of the experimental disease.

Jansen, J. (1961). **Duck plague.**—Brit. vet. J. **117**, 349-356. [Author's summary modified.] **3991**

A historical survey is given of the highly fatal, peracute disease in ducks, which was first observed in the Netherlands, in 1923. The epidemiology, symptoms and P.M. findings are described in detail. Experimental work quoted has shown that the virus is quite distinct from the viruses of Newcastle disease, fowl plague or duckling hepatitis. Two strains of the virus are described, the 'O' (old) strain from earlier outbreaks and the 'W' (Wageningen) strain from recent outbreaks.

Baron, S. & Isaacs, A. (1961). **Mechanism of recovery from viral infection in the chick embryo.**—Nature, Lond. **191**, 97-98. **3992**

Production of antibody and delayed hypersensitivity do not occur in chick embryos of any age, whereas the interferon mechanism begins to function in the embryo at about 8 days and increases thereafter. Using groups of chick embryos aged 4, 7, 10 and 13 days and vaccinia, Chikungunya or influenza viruses, the authors found that between the 7th and 10th days there was rapid development of sensitivity to the antiviral action of interferon and an equally rapid increase in the ability to recover from viral infections. The work suggests that interferon alone may be an essential factor in recovery from many viral infections.—E.V.L.

Hillis, W. D. (1961). **An outbreak of infectious hepatitis among chimpanzee handlers at a United States Air Force base.**—Amer. J. Hyg. **73**, 316-328. **3993**

The author describes an unusually high incidence of infectious hepatitis amongst personnel at the Holloman Air Force base in New Mexico. Of 35 veterinary staff who came into intimate contact with newly-imported chimpanzees, 11 contracted infectious hepatitis and so did 11 of 21 other persons in contact with the animals. The local incidence of this disease amongst the resident population is under 2 a 1,000 and the assumption is made that the chimpanzees acted as natural hosts. Many persons handling chimpanzees suffered from bites and scratches and transmission may have occurred this way. The incubation period between first contact with the chimpanzees and the appearance of clinical symptoms was from 4 to 6 weeks, which corresponds with the known incubation period of infectious hepatitis (2 to 6 weeks). Because no virus has so far been isolated from

human infectious hepatitis there are obvious difficulties in confirming the conclusions reached. Experimental work hitherto has failed to give convincing evidence that Primates including chimpanzees are susceptible to infectious hepatitis of human origin.

—R. N. FIENNES.

Dudgeon, J. (1961). **Modern aids to diagnosis of virus diseases.**—Brit. med. J. May 6th, 1269-1276. 3994

A discussion of methods employed in human virology.—R.M.

Powell, H. M., Walcher, D. N. & Mast, C. (1961). **Inhibition of cytopathic action of Salisbury virus by antiviral agent 1758.**—Proc. Soc. exp. Biol. N.Y. 107, 55-57. [Authors' summary.] 3995

It has been found that an antiviral agent called 1758, and somewhat similar to agent 8450 in antiviral action in mice, exhibits demonstrable inhibition of the cytopathic action of Salisbury virus, Strain H.G.P. This antiviral agent is of penicillium origin, and Strain H.G.P. is one of several strains reported of common cold origin.

Dane, D. S., Dick, G. W. A., Briggs, M., Nelson, R., McAlister, J., Connolly, J. H., McKeown, F. & Field, C. M. B. (1961). **Vaccination against poliomyelitis with live virus vaccines. 8. Changes in Sabin type I oral vaccine virus after multiplication in the intestinal tract.**—Brit. med. J. July 29th, 269-271. [Authors' summary modified.] 3996

Eleven children were fed Sabin type I vaccine virus. During the following month

three other children in contact with them became infected with the virus. The faecal and throat viruses excreted by the children produced paralysis and histological lesions in a proportion of the monkeys inoculated.

Matheka, H.-D. & Wittmann, G. (1961). **Das Entsalzen von Virus-Suspensionen durch Gel-Filtration. [Removal of salts from virus suspensions by gel filtration.]**—Zbl. Bakt. I. (Orig.) 182, 169-178. [Summaries in English, French, Spanish and Russian.] 3997

Pigeon pox virus and viruses of F. & M., Teschen, and Newcastle diseases were removed from salt solns. by filtration through a column of dextran gel. No loss of virus was observed. This method is quicker than dialysis in cellophane membranes.—M.G.G.

Stoenner, H. G., Lackman, D. B., Benson, W. W., Mather, J., Casey, M. & Harvey, K. A. (1961). **The role of dairy cattle in the epidemiology of Q fever in Idaho.**—J. infect. Dis. 109, 90-97. [Authors' summary modified.] 3998

The incidence of Q fever antibodies and of disabling febrile illnesses lasting 2 days or longer among families associated with 119 infected dairy herds was compared with findings among families associated with 141 Q fever-free herds. Twenty-six per cent of 333 persons in the former group were serologically positive, compared with only 14% of 394 persons in the latter group. Although dairy cattle were a source of human infection, a significant amount of clinical illness was not associated with this infection.

See also absts. 4209-4211 (reports, U.K.); 4212-4213 (reports, Nigeria); 4214 (report, Zanzibar).

IMMUNITY

DeLong, R. (1961). **Use of agar diffusion and fluorescent antibody.**—Nature, Lond. 190, 1126-1127. 3999

In the agar diffusion technique for analysis of antigenic materials there is difficulty in discerning the precipitation zones. By using fluorescent antibody, the precipitation zones viewed or photographed in the near ultra-violet range appear much clearer than with non-fluorescent antibody.—E.V.L.

Parks, J. J., Leibowitz, M. I. & Maumenee, A. E. (1961). **The effect of route of inoculation upon development of antibody in rabbits.**—J.

Immunol. 87, 199-204. [Authors' summary modified.] 4000

Comparable titres of specific circulating antibodies were induced following inoculation of identical quantities of soluble antigen either into the cornea or the vitreous humour. These titres were comparable with those induced when the same quantity of antigen is incorporated in adjuvant and injected i/m. These three methods of antibody induction have in common two basic mechanisms: slow diffusion of antigen from the site of inoculation, and the infiltration of the inoculation site with cells involved in the production of anti-

body. The use of avascular ocular routes in experimental immunization is suggested if antigen is scarce or if the use of an adjuvant is not desired.

Biggs, P. M. & Payne, L. N. (1961). **Pathological changes following the inoculation of chick embryos with adult cells. I. Spleen cells. II. Blood cells.**—*Immunology* 4, 24-37 & 38-48. 4001

I. Inoculation of 15-day-old chick embryos with adult cock spleen cells caused extensive proliferation of reticulum cell foci, primitive cells and granulocytes. These changes resulted in a rapid enlargement of the spleen and to a lesser extent of the liver. This phase which lasted 7 days was followed by lymphoid transformation of the reticulum cell foci and a gradual return to normal structure in both spleen and liver. Pathological changes were not observed in livers and spleens of chick embryos treated with adult rabbit spleen cells, bovine serum albumin, or Hanks' saline.

II. Three consecutive histological stages were observed after inoculation of adult fowl blood; the first 2 closely resembled those following injection of adult spleen cells and the 3rd stage was characterized by a depletion of lymphoid tissue in the liver and spleen and associated with the terminal phases of runt disease.

Bishop, D. W. (1961). **Aspermatogenesis induced by testicular antigen uncombined with adjuvant.**—*Proc. Soc. exp. Biol., N.Y.* 107, 116-120. [Author's summary modified.] 4002

Adult g.pigs produced no spermatozoa after repeated intracutaneous inj. of homologous testicular homogenate without adjuvant, and after injection of testicular antigen and complete adjuvant in separate sites on the same side of the neck. With testicular tissue alone, severe germinal lesions were induced after 100 days in animals injected 3 or 6 times weekly with 0.1 or 0.05 ml. respectively. Degree of germinal damage resulting from separate-site injection of uncombined antigen and adjuvant was com-

parable to that when testis is incorporated into complete liquid paraffin adjuvants before administration. Results of separate-site injections suggest dependency on a common lymphatic drainage system.

Raettig, H. & Wölk, B. (1961). **Provokation einer Infektion durch Schutzimpfung. VI. Mitteilung. Leukocytenwerte nach subcutaner Immunisierung der Maus. [Provocation of infection by immunization. VI. Leucocyte count after subcutaneous immunization of mice.]**—*Zbl. Bakt. I. (Orig.)* 182, 294-317. [Summaries in English, French, Spanish and Russian.] 4003

There was a decrease in the leucocyte count in the blood of mice immunized s/c with different bacterial vaccines or poliomyelitis vaccine. The minimum count was between 5 and 12 hours after injection. Only the lymphocytes participated in the decrease; the number of granulocytes usually increased. It was suggested that the lymphopenia was a transitory weakness in the defence system of the body.—M.G.G.

Metzgar, R. S. & Grace, J. T., Jr. (1961). **Agar precipitation reactions between human serum albumin and hemoglobin in human tissue extracts.**—*J. Immunol.* 86, 578-583. [Authors' summary modified.] 4004

Normal human and animal sera gave agar precipitation reactions with certain human tissue extracts.

The serum component reacting with the human tissue extracts had an electrophoretic mobility corresponding to albumin. The constituent in the human tissue extracts which interacted with albumin had an electrophoretic mobility corresponding to that of an α -2 globulin and appeared to be haemoglobin or a haemoglobin product. The precipitate formed was soluble in haemoglobin excess and its density was dependent upon the albumin concentration. The agar precipitation reactions were not demonstrable by other serological techniques. A cautious interpretation of immunological reactions in an agar medium was advised.

See also absts. 3826 (staphylococci); 3844-3846 (TB.); 3854 (B.C.G.); 3863 (c.f. test in melioidosis); 3864 (swine erysipelas); 3865 (histeriosis); 3874 (maternal transfer of anti-salmonella agglutinins in hedgehogs); 3875-3876 (salmonellosis); 3878-3883 (brucellosis); 3886 (leptospirosis vaccine for control of bovine abortion); 3891 (vibriosis); 3893 (anaerobic diseases); 3897 (botulism); 3904 (trichophyton); 3921 (trypanosomiasis); 3954 (influenza); 3955 (E.E.E. vaccine); 3959 (bovine rhinotracheitis vaccine); 3961-3963 (bovine myxovirus para-influenza); 3980 (simian foamy virus); 3985 (control of Newcastle disease and infectious bronchitis by vaccination); 4024, 4037, 4042, 4047 & 4049 (helminths).

PARASITES IN RELATION TO DISEASE [ARTHROPODS]

Macleod, J. & Donnelly, J. (1961). **Failure to reduce an isolated blowfly population by the**

sterile males method.—*Ent. exp. appl.* 4, 101-118. [Authors' abst. modified.] 4005

In 1956 and 1957 pupae of *Lucilia sericata* were irradiated at 6,000–7,000 rep, and allowed to emerge at three points on Holy Island. The sterilized population was maintained in preponderant numbers by regular replenishments. A test in 1958 showed no reduction in the density of the species. Possible causes of failure of the method are examined, and it is concluded that either the sterilization was inadequate or that the sterilized males were unable to compete with the native males.

Anderson, J. L. & Catley, A. (1961). **Screw worm in New Guinea.**—Aust. vet. J. 37, 201. 4006

Fly strike attributed to *Chrysomya micropogon* and *C. megacephala* on horses and cattle in Papua and New Guinea was recorded in 1946. *C. bezziana* was identified in 1952 (recorded 1954) from flies reared from larvae infesting wounds on cattle from Rabaul, and more recently from cattle in the Port Moresby area. To prevent the spread of *Chrysomya* spp. all vessels carrying livestock to Australia are treated with insecticide before leaving the Territory.—A. CULEY.

Drummond, R. O. (1961). **A new organophosphorus systemic insecticide for the control of larvae of *Oestrus ovis* L. in sheep.**—J. Parasit. 47, No. 4 Sect. 2 p. 36. [Author's abst. modified.] 4007

Single oral drenches of Bayer 37342 [O, O-dimethyl O- (3, 5-dimethyl-4-methylthiophenyl) phosphorothioate] at doses of 50 and 100 mg. per kg. were completely effective in ridding sheep of all three larval instars of *Oestrus ovis*. At 25 mg. per kg. the compound was not completely effective. Single treatments of 50 and 100 mg. per kg. in the feed were also completely effective, but i/m inj. of 25 and 50 mg. per kg. were less effective. Most bots were expelled but a few were found dead in the nostrils or in blind sinuses. None of the sheep exhibited symptoms of phosphorus insecticide poisoning.

Rich, G. B. & Ireland, H. R. (1961). **An appraisal of Ruelene and Trolene against cattle grub infestations, (Oestridae: Diptera).**—Canad. J. Anim. Sci. 41, 115–119. [Authors' abst. modified.] 4008

Ruelene i/m inj. at 5 and 10 mg./kg. and fenclorophos (Trolene) boluses at 105 mg./kg. reduced the numbers of warbles by 83, 86 and 86%, respectively: these reductions were not significantly different. Intramuscular

injections did not cause detectable lesions at the injection site in 90 calves. The injection method was preferred to the bolus method for ease of administration, economy of labour, and decreased danger of injury to animals. Feeding Ruelene at 5 mg./kg. and 10 mg./kg. daily for 5 days, and feeding fenclorophos at 15 mg./kg. daily for 7 and 12 days, reduced the numbers of warbles by 95, 94 and 97% respectively.

Bauch, R. J. (1961). Probleme der biologischen Insektizidprüfung I. Freiland-Versuchstechnik zur innertherapeutischen Dasselffliegenbekämpfung. [Problems of biological testing of insecticides. I. Field technique of internal therapy for ox warbles.]—Angew. Parasit. 2, 1–6. [Summaries in English and Russian.] 4009

Conditions for successful control of ox warbles by internal therapy are:—determination of the infested area; preliminary trials of the toxicity of the drug in small animals such as chicks; temporary housing of the cattle for ease of treatment and subsequent observation for symptoms of toxicity, otherwise high doses should not be given; examination of the cattle once a month from January to July, with external treatment of infested animals.—M.G.G.

Andersen, E. H. (1961). **Systemic insecticides for control of tropical warble fly (*Dermatobia hominis*) in cattle.**—J. Amer. vet. med. Ass. 139, 104–107. 4010

Two isolated groups of Costa Rican cattle infested with *D. hominis* were treated either intramuscularly with dimethoate (Am. Cyanamid 12880, rogor) at the rate of 10 mg./kg., or by spraying with 1 or 2% trichlorphon (Neguvon). The cattle were treated 4 times at intervals of about 30 days (those dosed with dimethoate were also sprayed with BHC against ticks and adult *D. hominis*). Larval counts in both herds fell to 5–15% of the pre-treatment levels, and were less than those of some untreated cattle (although these had been treated with an unspecified insecticide and no original larval counts were included for these animals).

—W. N. BEESLEY.

Andreev, K. P. & Zakamyrdin, I. A. (1961). [Hexamethylenebenzamide (hexamid B) as a repellent of tabanid flies on cattle.]—Veterinariya, Moscow No. 6 pp. 68–69. 4011

Zakamyrdin, I. A. (1961). [Protection of livestock from blood-sucking diptera with the aid

of polychlorpinene.] — Ibid. pp. 70-73. [In Russian.] 4012

Cattle were protected from flies by spraying them with 1 or 2% emulsion of hexamid B, or a mixture of 2% hexamid B and 3% polychlorpinene, or a 2-3% emulsion of polychlorpinene alone. Protection lasted 2-3 days.—R.M.

Granett, P. & Hansens, E. J. (1961). **Tests against face flies on cattle in New Jersey during 1960.**—J. econ. Ent. 54, 562-566. 4013

No really effective residual treatment against face flies (*Musca autumnalis*) was found, although up to 2 oz. of sprays or smears were applied to the heads of cattle. Protection for a few hours followed the use of synergized pyrethrins plus repellents (butoxypolypropylene glycol and "MGK R1207", i.e., 3-chloropropyl *n*-octyl sulphoxide). A 1:10 mixture of methoxychlor: butoxypolypropylene glycol and 0.2-0.5% Dibrom were also effective for about 6-8 hours. Dibrom tends to produce slight skin irritation to both cattle and operators. Other insecticides tested, including coumaphos (Co-Ral), Diazinon, rogor (dimethoate), and DDVP, were of little value either alone or in sugar bait smears. The more effective insecticides produced a generally beneficial effect on horn fly and stable fly attacks.

—W. N. BEESLEY.

Bateman, N. (1961). **Simultaneous eradication of three ectoparasitic species from a colony of laboratory mice.**—Nature, Lond. 191, 721-722. 4014

The mouse mange mites *Myocoptes musculus*, *Myobia musculi* and *Psorergates simplex*, and the blood-sucking louse *Polyplax serrata*, were completely eradicated from a colony of laboratory mice by dipping in a soln. of 67 g. of "Tetmosol" [monosulfiram, B.Vet.C.], 2 g. of "D.M.C." [di-(*p*-chlorophenyl) methylcarbinol] in 3 g. of ethanol, to which one litre of warm water had been added.—E.G.

Sinclair, A. N. (1961). **Field trials with the jetting technique for applying insecticides to control itch mite (*Psorergates ovis*) of sheep.**—Aust. vet. J. 37, 211-216. 4015

"Jetting" was less effective than dipping as a method of applying insecticides to sheep for the control of itch mite. On a Queensland property sheep were examined periodically over 3 years. On some of these sheep the mite population declined each summer; others

remained free from infestation although in contact with infested sheep. S. considers that shearing in midsummer influenced the behaviour of the mite population and favoured the insecticidal treatments.

—N. P. H. GRAHAM.

Harrison, I. R. & Marshall, P. G. (1961). **The depletion of insecticides in sheep-dipping baths: further field trials.**—J. Sci. Fd Agric. 12, 548-552. [Authors' abst. modified.] 4016

In experiments on the depletion of aldrin, dieldrin and γ -BHC from dipping baths, replenishment procedures were varied in an endeavour to maintain a more uniform dip throughout a trial. A study was made of the change in physical behaviour of the dip with the passage of large numbers of sheep and of the eventual stabilization of insecticide concentration. A reason for this stabilization of concentration was suggested.

Emby, G. N. & Gallagher, P. J. (1961). **Factors affecting losses of benzene hexachloride in dipwash samples.**—J. S. Afr. vet. med. Ass. 32, 71-74. [Authors' summary modified.] 4017

Bacterial decomposition, initiated in dipping tanks, is a factor to be considered when dip-wash samples containing BHC are in transit for analyses. It is essential that these samples reach the laboratory as soon as possible following sampling, in order that the analytical results reflect the actual concentration of BHC in the tank at the time of sampling. As₂O₃ (0.16%) when added to dip-wash samples inhibits bacterial decomposition effectively. Such a material could be added to samples when delays in analyses are anticipated.

Polythene plastic absorbs BHC: it is recommended that polythene bottles should not be used to hold dip-wash samples or other dilutions containing BHC.

Smith, J. (1961). **Demodicidosis in large domestic animals—a review.** pp. 56. Ottawa: Health of Animals Division, Canada Department of Agriculture. 4018

This is a very useful and comprehensive review of demodectic infection of cattle, goats, sheep, pigs and horses. For each host there are notes on the morphology, life cycle, habitat, geographical distribution, incidence, transmission, pathogenesis, symptoms, pathology, treatment and control. More detail might have been supplied on the use of the newer acaricides and a table of contents

would have increased the value of the book. A very handy source book, with several recent

Russian references among the 100-odd cited.

—W. N. BEESLEY.

See also absts. 3919 (report, West African Institute for Trypanosomiasis Research); 3945 (failure of lice to transmit Aujeszky's disease); 4210 (report, U.K.).

PARASITES IN RELATION TO DISEASE [HELMINTHS]

Varachiu, N., Pascu, T., Ionescu, A. & Nistor, T. (1960). Cercetări asupra determinării bilirubinemiei în afecțiunile hepatice de natură parazitară la oi. [*Bilirubinaemia in parasitic diseases of the liver in sheep.*] — Lucr. Inst. Agron. București Ser. C, No. 4 pp. 193-197. [In Roumanian. Summaries in French and Russian.] 4019

In 43 healthy sheep the average direct bilirubin content per ml. serum was 0.13 mg.% and the average total content 0.40 mg.%. In 79 sheep with either echinococcus, fasciola or microcoelium in the liver, direct values were increased and indirect values reduced, depending on the degree of infestation, although the total bilirubin content per ml. serum remained within the physiological limits.—E.G.

Malek, E. A., Ash, L. R., Lee, H. F. & Little, M. D. (1961). *Heterobilharzia infection in the dog and other mammals in Louisiana.*—J. Parasit. 47, 619-623. [Authors' summary modified.] 4020

Heterobilharzia americana was common in raccoons and nutria and was present in all of three dogs examined. One of the dogs died. The authors claimed that this was the first record of canine schistosomiasis in the Western Hemisphere. In all four host species, the worms were located in the veins of both small and large intestines and in the intra-hepatic portal veins. Eggs were abundant in the wall of the intestines, and granulomata containing eggs were conspicuous in all parts of the liver. In the dog, eggs were also found in the lungs, kidneys and spleen.

I. Froyd, G. (1961). *The artificial infection of calves with oncospheres of Taenia saginata.*—Res. vet. Sci. 2, 243-247. 4021

II. Silverman, P. H. & Hulland, T. J. (1961). *Histological observations on bovine cysticercosis.*—Res. vet. Sci. 2, 248-252. [Authors' summaries modified.] 4022

I. Subcutaneous injection of hatched oncospheres into calves did not appear to influence their susceptibility to infection by natural means, or by artificial oral dosing with *Taenia* eggs. Cysts did not migrate from the primary site of parenteral infection.

II. The rate of growth of *C. bovis* in calves was highly variable during the first month after infection. The host reaction is an acute inflammatory response, becoming chronic after 2 months. The breakdown and degeneration of the cyst are described.

Polyanskaya, M. V. (1961). [*Moniezia infestation in reindeer calves.*]—Veterinariya, Moscow No. 7 pp. 46-47. [In Russian.] 4023

The peak of infestation occurred in July and August, when nearly all reindeer calves examined were found to be infested, compared with 27-38% of those aged 18 months, and 13-15% of adults. Species found were *M. bæeri*, *expansa* and *benedeni*. The number of tapeworms in calves ranged from a few to 62. Heavy infestation caused unthriftiness and emaciation, sometimes fatal.—R.M.

Heyneman, D. (1961). *Studies on helminth immunity. III. Experimental verification of autoinfection from cysticercoids of Hymenolepis nana in the white mouse.*—J. infect. Dis. 109, 10-18. 4024

Many *Hymenolepis nana* developed in mice after feeding of 1-30 cysticercoids recovered from grain beetles *Tribolium confusum*. Coprophagy was prevented. A tissue phase occurred in mice fed ova and it was accompanied by formation of immunity to subsequent infestation. This was not observed in mice fed cysticercoids and it appeared that the lack of this resistance was responsible for auto-infection. The relationship of human to murine strains of the tapeworm was discussed with a view to the possible accidental ingestion by man of grain beetles contaminated from mouse faeces.

—E.G.

Shah, H. L. & Pandit, C. N. (1959). *A survey of helminth parasites of domesticated animals in Madhya Pradesh. Part I.*—J. vet. Res., Mhow 4, 1-10. 4025

Animals examined included horse, cattle, buffalo, sheep, goat, camel, pig, dog, cat, tiger, fowl. Results are tabulated.—R.M.

Nadakal, A. M. (1961). *Frequency and seasonal fluctuations of infections of sheep with certain helminth parasites in Northern India.*—J. Parasit. 47, No. 4 Sect. 2 p. 57. [Abst. from author's abst.] 4026

During three years 261 slaughtered sheep were examined. Paramphistomes were found in 5%; species of *Bunostomum* and *Oesophagostomum* in 50%; *Haemonchus* in 80%; tapeworms of the genera *Stilesia*, *Moniezia*, and *Avitellina* in 80, 50, and 30% respectively. Multiple infections were much more frequent than single ones. Very few worms were found in young sheep.

Immature tapeworms were encountered during August and September and again in February and March there was the incidence of young worms. The periods of fresh infections seem to be correlated with rains and the subsequent appearance of vectors like the oribatid mites on grasses.

Phillipson, R. F. & Kershaw, W. E. (1961).

The production, deposition and growth of the larvae of *Trichinella spiralis*, and their significance in the chemotherapy of the infection. II. Production and deposition of larvae.

—Ann. trop. Med. Parasit. 55, 231-234.

[Authors' summary modified.] 4027

Trichinella larvae were recovered by maceration and by digestion of the muscles of mice which had been infected with known numbers of infective larvae. The numbers recovered by the two methods were counted. No larvae were recovered before the sixth day after infection; most were deposited between the 6th and 12th days, and only a few were deposited later. They remain in the blood for a very short time. By analogy with the infection in man, most of the larvae are deposited in the muscles before the onset of symptoms.

Drudge, J. H. & Elam, G. (1961). **Preliminary observations on the resistance of horse strongyles to phenothiazine.**—J. Parasit. 47, No. 4 Sect. 2 pp. 38-39. 4028

Drudge, J. H., Wyant, Z. N. & Elam, G. (1961). **Observations on the efficacy of three phenothiazine preparations on a phenothiazine-resistant strain of *Haemonchus contortus*.**—Ibid. p. 39. 4029

I. Phenothiazine failed to alter strongyle egg counts in Thoroughbred horses on three farms. On each farm only full therapeutic doses had been given in recent years. Piperazine alone or combined with phenothiazine eliminated nearly all strongyle eggs from the faeces.

II. There appeared to be no difference in action between three preparations having average particle sizes of 8.2, 10.8 and 17 μ

when given to lambs harbouring a resistant strain of *H. contortus*.—R.M.

Drudge, J. H., Wyant, Z. N., Elam, G. & Rothenberger, G. (1961). **Synergistic action between phenothiazine and piperazine-carbon disulphide complex against horse strongyles.**—J. Parasit. 47, No. 4 Sect. 2 p. 40. 4030

A single administration by stomach tube of phenothiazine (1.25 or 2.5 g./cwt. body wt.) mixed with piperazine-carbon disulphide complex (Parvex, 4 g./cwt. body wt.) removed nearly all strongyles. The mixture was more effective against the larger species than either component used alone.—R.M.

Cuckler, A. C. (1961). **Thiabendazole, a new broad spectrum anthelmintic.**—J. Parasit. 47, No. 4 Sect. 2 pp. 36-37. 4031

Campbell, W. C. (1961). **Effect of thiabendazole upon infections of *Trichinella spiralis* in mice, and upon certain other helminthiases.**—Ibid. p. 37. 4032

Egerton, J. R. (1961). **The effect of thiabendazole upon *Ascaris* and *Stephanurus* infections.**—Ibid. p. 37. 4033

Alicata, J. E. (1961). **On the ineffectiveness of thiabendazole against the migrating larval stages of the swine kidney worm (*Stephanurus dentatus*) in rabbits.**—Ibid. p. 38. 4034

Drudge, J. H. & Elam, G. (1961). **Comparison of thiabendazole, ruelene and phenothiazine for anthelmintic activity in sheep.**—Ibid. pp. 39-40. 4035

Bailey, W. S., Diamond, D. L. & Walker, D. F. (1961). **Observations on the use of thiabendazole in sheep and cattle.**—Ibid. pp. 40-41. 4036

Thiabendazole is 2 (4^l-thiazolyl)-benzimidazole. It is active against many nematodes and some tapeworms. A safe and effective dosage for sheep and cattle was 55 mg./kg. body wt.—R.M.

Dow, C., Jarrett, W. F. H., Jennings, F. W., McIntyre, W. I. M. & Mulligan, W. (1961). **Studies on immunity to *Uncinaria stenocephala* infection in the dog—double vaccination with irradiated larvae.**—Amer. J. vet. Res. 22, 352-354. [Authors' summary modified.] 4037

To immunize pups against infection with *Uncinaria stenocephala*, a vaccine composed of irradiated infective larvae was used. A high degree of resistance to challenge followed treatment with 2 doses of this vaccine.

Rawes, D. A. & Clapham, P. A. (1961). **A new anthelmintic thenium (N: N-dimethyl-**

N-2-phenoxyethyl-N-2'-thenylammonium) p-chlorobenzene sulphonate: its activity against hookworms and roundworms in the dog.—Vet. Rec. 73, 755-758. [Authors' summary modified.] 4038

Thenium p-chlorobenzene sulphonate was very highly active against *Ancylostoma caninum* and *Uncinaria stenocephala* in the dog but less active against *Toxocara canis*. A dose of 200 to 250 mg. morning and evening was the minimum effective dose for the young puppy, and it was not necessary to increase this dose for older, heavier animals. No side effects, except a low incidence of vomition, were observed.

Zimmermann, W. J. & Hubbard, E. D. (1961).

Gastrointestinal parasitism in Iowa cattle.—J. Amer. vet. med. Ass. 139, 555-559. [Authors' summary modified.] 4039

Faeces were collected at intervals of 2 months from 19 herds (1,750 cattle) during 1955-1958. There were trichostrongyle-type eggs in more than half of the samples, ranging from 14.5% in dairy calf faeces to 80% in beef calf samples.

Only 14 of 1,582 samples examined contained more than 300 eggs per gram; 13 of these were from a single herd. No seasonal fluctuation was noticed. *Nematodirus* and *Eimeria* were predominantly parasites of calves, whereas *Moniezia* eggs were found in low numbers in all age groups. *Strongyloides*, *Capillaria*, *Trichuris*, and *Ascaris* eggs were found only occasionally.

Bremner, K. C. (1961). **A study of pathogenic factors in experimental bovine oesophagostomosis. I. An assessment of the importance of anorexia.**—Aust. J. agric. Res. 12, 498-512. [Author's summary modified.] 4040

Using pair-fed calves, one of each pair was infected with 700 *Oesophagostomum radiatum* larvae. Mild to moderately severe disease of fairly short duration resulted, the first signs being seen at 3-5 weeks. There was improvement from the 10th week and gradual recovery from the 14th week after infection. When anorexia developed in infected calves the same reduction in food intake was imposed upon the controls by withholding part of the ration.

Infected calves on the same feed intake as controls showed a much greater departure from normal in respect of rate of gain in weight, and their growth was more severely retarded. The mean feed utilization of these

calves was 0.039 lb. per pound of feed, as compared with 0.095 lb. for the controls. Diarrhoea, normochromic normocytic anaemia, and hypoproteinaemia were most severe when the helminths were in the early fifth stage of development.

It is concluded that anorexia is a factor which, through reduction of food intake, contributed considerably to pathogenesis. Other factors together exercised an effect almost as great.

Mayhew, R. L. & Lank, R. B. (1961). **Studies on bovine gastrointestinal parasites. XXIV. Results of some phenothiazine, copper sulphate and nicotine sulphate experiments.**—J. Parasit. 47, 637-640. [Authors' summary modified.] 4041

Four naturally infected heifers were treated with 10 g. of phenothiazine per 100 lb. body wt., followed by copper sulphate, then by copper sulphate plus nicotine sulphate. The parasites present were *Cooperia punctata*, *Bunostomum phlebotomum*, *Nematodirus* spp., and *Oesophagostomum radiatum*. The eggs of *Oe. radiatum* were eliminated by the daily feeding of 1.5 g. of phenothiazine. Eggs of the other species were not affected by the treatment.

One animal experimentally infected with *C. punctata* was treated with phenothiazine at 10, 18, 30, 50, and 70 g. per 100 lb. body wt. Reductions in the egg count levels occurred following each treatment (except the lowest dose) but in each instance the numbers gradually increased to the former counts.

Two animals with pure infection of *Oe. radiatum* were treated with 10 g. of phenothiazine per 100 lb. body wt. The egg count became zero two days afterwards and remained so for 38 and 71 days, respectively. One animal then produced eggs at 4% and the other at 17% of the former level.

Allen, R. W. & Samson, K. S. (1961). **Preliminary report on the immunization of sheep with a relatively non-pathogenic strain of Haemonchus from pronghorn antelope.**—J. Parasit. 47, No. 4 Sect. 2 p. 22. [Authors' abstr. modified.] 4042

Six lambs received 10,000 infective larvae of a strain of *Haemonchus* that had been isolated from a pronghorn antelope in February 1958 and passed through domestic lambs 11 times. Another six received 10,000 larvae of a sheep strain.

At 63 days after inoculation, 4 lambs in each group were challenged with 15,000 larvae

of the sheep strain; 4 controls were also infected. As compared with the controls lambs inoculated initially with the antelope strain were significantly resistant to challenge with the sheep strain. This resistance was not as great as in sheep immunized with the sheep strain.

Vujić, B., Petrović, Z. & Petrović, K. (1961). Neka pitanja epizootologije nematodiroze na našim terenima. [Epidemiology of *Nematodirus infestation in sheep in Yugoslavia*.]—Vet. Glasn. 15, 497-503. [In Croat. Summary in German.] 4043

In a mountainous area highest incidence of infestation in lambs with larvae of *Nematodirus filicollis* and *N. spathiger* was during April and May, although pastures were contaminated with larvae all the year round. Under laboratory conditions larvae resisted repeated drying periods of up to two days and after eight months of such treatment a certain proportion of them still survived. Female worms collected during May carried 55-60 eggs, those collected in December only about 20.—E.G.

Wood, I. B., Emro, J. E. & Waletzky, E. (1961). The anthelmintic effect of a sulfa-moylphenyl phosphorothioate on the gastrointestinal nematodes of ruminants. — J. Parasit. 47, No. 4 Sect. 2 p. 36. [Authors' abst. modified.] 4044

The *O*, *O*-dimethyl-*O*-*p*-(dimethylsulphamoyl) phenyl ester of phosphorothiotic acid [American Cyanamid 38,023] was active against many of the economically important parasites of sheep. Single oral doses of 60 mg. per kg. nearly completely eliminated adult worms of *H. contortus* and of *Cooperia* spp.; 80 mg. per kg. gave the same control of *Ostertagia* spp., *T. axei* and *T. colubriformis*, but *Nematodirus* spp. were much less susceptible.

In sheep, this compound was relatively safe orally at 400 mg. per kg. with temporary partial anorexia of 2 or 3 days' duration; 800 mg. per kg. was lethal. No signs of toxicity were observed with oral doses of 200 mg. per kg. or less.

Kingsbury, P. A. (1961). Organo-phosphorus esters and phenothiazine acting synergistically as anthelmintics.—Res. vet. Sci. 2, 265-271. [Author's summary modified.] 4045

Combinations of phenothiazine with coumaphos or with its phosphoroate analogue, Coroxon, acted synergically when employed as

anthelmintics against some nematode parasites. Worm counts made after the slaughter of 155 dosed lambs and appropriate controls indicated that 200 mg./kg. of phenothiazine plus 2-2.5 mg./kg. of coumaphos or 200 mg./kg. of phenothiazine plus 1.5-2 mg./kg. of Coroxon had removed the following:—84-99% of intestinal *Trichostrongylus* spp.; 70-98% of *Strongyloides papillosus*; 98-100% of *Haemonchus contortus*; 79-99% of *Trichostrongylus axei*; and 33-99% of *Ostertagia* spp.

Limited data also suggested high efficiency against *Cooperia* spp. and *Nematodirus* spp. *Trichuris ovis* and *Moniezia expansa* resisted treatment.

Timmerman, J. A., Jr., Turner, H. F. & Arthur, B. W. (1961). Anthelmintic activity and metabolism of ruelene administered to sheep.—J. Parasit. 47, No. 4 Sect. 2 p. 38. [Authors' abst. modified.] 4046

Ruelene labelled with radiophosphorus and administered orally to sheep was rapidly absorbed, metabolized and eliminated, chiefly in the urine as water-soluble degradation products. By 24 hours after treatment of sheep with 50 mg. per kg., half of the administered drug was eliminated in the urine and 4% in the faeces. Eight metabolites were isolated from the urine and four of these were identified. Five and possibly six metabolites were isolated from several genera of helminths taken from the digestive tract of sheep killed 6 and 24 hours after treatment.

Ruelene formulated as a polymer was less readily absorbed, and less was deposited in the tissues, while a larger percentage was eliminated in the faeces. The polymer constituents also prevented the Ruelene from leaching from faeces placed under natural weathering conditions for 20 days.

Three formulations of Ruelene (wetable powder, liquid drench, Ruelene plus Polymer) were quite effective against species of *Haemonchus*, *Trichostrongylus*, *Ostertagia*, and *Trichuris*. Ruelene was not effective against *Nematodirus*, *Moniezia* or *Oestrus ovis*.

Engelbrecht, H. J. (1961). An experiment demonstrating the safety and potency of X-irradiated *Dictyocaulus viviparus* larvae vaccine in calves.—J. Parasit. 47, No. 4 Sect. 2 p. 21. [Author's abst. modified.] 4047

Calves 6 to 8 weeks old were treated as follows. Ten given 1,000 irradiated larvae (40,000 r) were killed from 42 hours to 29

days after vaccination. No gross lesions attributable to the vaccination were noted. One larva was found in one calf. Five controls were given 1,000 non-irradiated larvae. Seven were given two doses of 1,000 irradiated larvae (40,000 r) with an interval of 30 days between doses. They were killed at intervals ranging from 2 to 29 days after the second dose. No gross lesions attributable to the vaccination were noted; lungworms were found in one calf. Five calves given two doses of irradiated larvae were challenged with 4,000 non-irradiated larvae. Very few gross lesions were noted; an average of 3.8 lungworms per calf was found in the lungs 31 days after challenge. Three untreated controls were also challenged, and extensive pneumonic lesions were noted 31 days after challenge. An average of 636 lungworms per calf was found in the controls.

Rose, J. H. (1961). **Three lungworms recently recorded from British sheep.**—Res. vet. Sci. 2, 253-258. [Author's summary.] 4048

Cystocaulus ocreatus, *Neostrongylus linearis* and *Protostrongylus brevispiculum*, three lungworms recently recorded from British sheep, are briefly described. Illustrations are provided to facilitate the identification of these three species.

Jovanović, M., Nevenić, V., Sokolić, A., Sofrenović, D., Gligorijević, J., Čuperlović, K. & Movsesijan, M. (1961). **Vakcinacija ovaca zračenim larvama Dictyocaulus filaria. I. Uticaj doze ozračavanja na razviće i patogenost parazita. [Vaccination of sheep with irradiated Dictyocaulus filaria larvae. I. Influence of dose of irradiation on pathogenicity of the parasite.]**—Vet. Glasn. 15, 455-464. [In Croat. Summary in English.] 4049

The optimal effective inactivating dose of X-ray or gamma-ray exposure for third stage larvae of *D. filaria*, intended as vaccine, was between 40,000 and 60,000 r. About 0.2% of larvae irradiated with X-rays reached the adult stage, compared with only about 0.025% of those irradiated with gamma-rays, when equivalent doses of both types of irradiation were used. Over a period of 55 days, about 26% of non-irradiated and only 2.2% of irradiated larvae reached sexual maturity. The sex-ratio of females over males in non-irradiated larvae was 1.62:1, in irradiated larvae 11.5:1.—E.G.

Alibasoglu, M., Kradel, D. C. & Dunne, H. W. (1961). **Cerebral nematodiasis in Pennsylvania deer (*Odocoileus virginianus*).**—Cornell Vet. 51, 431-441. [Authors' summary modified.] 4050

In a survey of 81 deer heads for *Elaphostrongylus tenuis* 75% were infested. Histologically a chronic, non-purulent, eosinophilic, verminous meningitis involving principally the dura mater was found. These parasites may therefore cause nervous disorders in deer.

Gazzinelli, G., Guia, M. M., Neves, A. G. A., Pudles, J., Beraldo, W. T. & Dias da Silva, W. (1961). **Purification of the toxic fractions from *Ascaris lumbricoides* and their effect on the guinea pig.**—Nature, Lond. 190, 813-814. 4051

An extract of *A. lumbricoides* was obtained by the method described by Rocha e Silva & Graña (1946). This fraction was purified further by precipitation with ammonium sulphate and alcohol, dialysis against distilled water, and passage through a column of hydroxyapatite. Chemical analysis of the 2 fractions revealed a complex substance containing sugars and protein. An anaphylactic-like reaction developed in g.pigs injected i/v with the fractions. The purified fraction released histamine from isolated g.pig lung, and evoked strong contraction in g.pig ileum.—M.G.G.

Buryabash, F. N. (1961). **[Losses in meat production associated with helminth infestations in cattle, sheep and pigs.]**—Veterinariya, Moscow No. 4 pp. 71-72. [In Russian.] 4052

In the Stalinsk district, in the years 1957-59, meat inspection revealed helminth infestations in 20.5% of 888,541 cattle, 15% of 537,406 sheep, and 6% of 1,626,510 pigs. —M.G.G.

Fried, K. & Jantošovič, J. (1961). **Poznatky o diagnostike askaridiozy hydiny röntgenom. [X-ray diagnosis of ascaridia infestation in fowls.]**—Veterinářství 11, 298-300. [In Slovak.] 4053

Using a barium contrast medium, it was possible to demonstrate radiologically adult ascaridia in the intestine of 25 fowls. This method was unsuitable for the demonstration of larval forms and it failed to show the extent of infestation. Its value as a diagnostic aid, supplementing faecal and clin. examination, was discussed.—E.G.

Knežík, J. & Hovorka, J. (1961). Rozbor výskytu helmintov domácej hydiny v ČSSR a preventívnych metód boja s nimi v podmienkach veľkochovu. [**Helminth parasites in fowls in Czechoslovakia and their control.**] — Veterinářství 11, 294-298. [In Slovak.] 4054

Data on the incidence of helminth parasites, gathered from 2,090 P.M. examinations of fowls, turkeys, geese and ducks were given and methods of control of the more common parasites were discussed.—E.G.

Rothstein, N., Kinnamon, K. E., Brown, M. L. & Carithers, R. W. (1961). **Canine microfilariasis in Eastern United States.** — J. Parasit. 47, 661-665. 4055

This gives details of a survey that have

See also absts. 4210-4211 (reports, U.K.).

SPONTANEOUS AND TRANSMISSIBLE NEOPLASMS AND LEUCAEMIAS [INCLUDING FOWL PARALYSIS]

Magnusson, G. (1961). Primärtumoren im Herzen des Rindes. [**Primary cardiac tumours in cattle.**]—Dtsch. tierärztl. Wschr. 68, 405-409. [Summary in English.] 4057

A description, with 5 illustrations, of 42 cases of cardiac tumours in cattle, consisting of 23 fibromas, 11 neurinomas, 5 fibrosarcomas and 3 neurofibromas.—E.V.L.

Vlăduțiu, O., Murgu, I. & Blidaru, T. (1960). Contribuții la studiul și tratamentul tumorilor veneriene la cățea și pisică. [**Venereal tumours and their treatment in dogs and cats.**]—Lucr. Inst. Agron. București Ser. C, No. 4 pp. 269-286. [In Roumanian. Summaries in French and Russian.] 4058

Details were given of transplantable venereal tumours, mainly lymphosarcoma, in 461 bitches and a number of cats, affecting mainly the external genital organs. Infection by subcutaneous transplantation of tumorous tissue rendered animals immune to subsequent infection. Total removal of the tumour was the best treatment.—E.G.

Rosenberg, J. C., Assimacopoulos, C., Lober, P., Rosenberg, S. A. & Zimmermann, B. (1961). **The malignant melanoma of hamsters. I. Pathologic characteristics of a transplanted melanotic and amelanotic tumor.**—Cancer Res. 21, 627-631. 4059

The neoplasm reported by J. G. Fortner [*Cancer* 10, 1153 (1957) and *Cancer Res.* 18, 98 (1958)] was investigated. Part II of this

already been reported in brief [*V.B.* 31, 1877].—R.M.

Ponomarenko, V. A. (1961). [**Control of leeches of the genus *Protocleipsis* in the respiratory passages of ducks.**]—Veterinariya, Moscow No. 7 pp. 56-57. [In Russian.] 4056

Leeches (*P. tessellata* and *P. maculosa*) killed 170 of 1,800 ducks within two days in July. Death was due to asphyxia from leeches in the nasal passages and trachea. 95% of ducks aged 1-2 months each had up to 19 leeches in the nasal passages and conjunctiva; their growth was retarded and some died. Leeches were killed by immersing the duck's beak, until the nostrils were covered, in 4-10% lactic acid soln. for 3-5 seconds.

—R.M.

paper, dealing with tissue culture of the melanoma, appears on pages 632-635 of *Cancer Research*.—R.M.

Monlux, W. S. (1961). **Blood vessel hamartias in the chicken.** — Iowa St. Univ. Vet. 23, 125-126. 4060

Cannibalism in chickens is often initiated by the presence of bleeding hamartias (haemangiomas) in the skin. These defects of blood vessels are very common in chickens, and are a heritable disease of White Leghorns. Their presence is recognized by blood-soiled feathers, fatal cutaneous haemorrhage, or cannibalism. Occasionally, hamartias (haemangiomas) are found in the internal organs, notably the liver. Fatal haemorrhage is the most common result of the hepatic lesions.—M.G.G.

Crispens, C. G., Jr. (1961). **Chemical carcinogenesis in birds. A review.**—Poult. Sci. 40, 745-761. [Author's summary modified.] 4061

The literature on neoplasms in birds is both extensive and controversial. In this paper an attempt has been made to review that portion concerning the chemically induced avian tumours and their transmissibility. A section dealing with much of the recent literature on the Rous sarcoma is included.

Anon. (1960). **Report of a symposium on the provision of animals for cancer research held at the Royal Society of Medicine on 23rd May, 1960.** pp. 116. Carshalton: Laboratory

Animals Centre. 12s. 6d. [Collected papers Vol. 9.] 4062

Among the 14 papers presented at the symposium were the following: spontaneous tumours in mice, by P. R. Peacock;

epidemiology of polyoma virus in a mouse colony, by M. H. Salaman & K. E. K. Rowson. The other papers dealt with cancer research and supply of experimental animals. —R.M.

NUTRITIONAL AND METABOLIC DISORDERS

Horton, R. E. & Hickey, J. L. S. (1961). **Irradiated diets for rearing germfree guinea pigs.**—Proc. Anim. Care Panel 11, 93-106. [Authors' abst. modified.] 4063

Complete rations for rearing germ-free guinea-pigs were sterilized successfully by a dose as low as 2 megarads from a Van de Graaff electron beam accelerator. While conventional g.pigs maintained on a natural diet sterilized at 3 megarads grew reasonably well and reproduced satisfactorily, this diet was inadequate for rearing germ-free animals. A semi-synthetic ration sterilized at 2 megarads produced germ-free animals of good quality as regards early growth and general physical condition. The fact that conventional animals receiving the sterilized semi-synthetic diet grew at a faster rate suggests that unidentified or additional growth factors are contributed by the action of the intestinal microflora. Observations relating to the size of the caecum and certain haematological values for both the germ-free and conventional animals are presented.

McCance, R. A., Ford, E. H. R. & Brown, W. A. B. (1961). **Severe undernutrition in growing and adult animals. 7. Development of the skull, jaws and teeth in pigs.**—Brit. J. Nutr. 15, 213-224. 4064

The skulls were examined from 3 groups of pigs (a) 16 normal pigs killed at various ages from birth to 15 months, (b) 18 severely undernourished pigs which had died or were killed between 3 and 15 months and (c) 5 pigs underfed for 12-24 months and then fed a full diet. Skulls were sawn longitudinally, measured, and the teeth examined and X-rayed.

Undernutrition did not affect the size of the endocranial cavity as much as the rest of the skull, although it was smaller than normal. Growth of the lower jaw was less severely retarded than that of the upper jaw and thus it projected and in some cases there was serious malocclusion of teeth. Tooth development and eruption and the absorption of deciduous dentition were all delayed, but the crowns were of normal size, with the

exception of the third molar. This led to overcrowding of the teeth and impaction of the molar surfaces of both deciduous and permanent teeth which became worn rapidly. The proportions of the skulls and jaws of the pigs in group (c) rapidly returned to normal but tooth abnormalities remained.

—E. J. CASTLE.

Storry, J. E. (1961). **Changes in blood constituents which occur in dairy cattle transferred to spring pastures.**—Res. vet. Sci. 2, 272-284. [Author's summary modified.] 4065

Changes in the packed cell volume, the concentrations of plasma Ca, Mg, K and Na, and the concentrations of red blood cell K and Na which occur when dairy cattle are transferred from conditions of stall feeding to those of grazing pastures under different manurial treatments, were studied.

The plasma Mg concentrations fell significantly during the first 2 weeks at pasture and then rose again, but the recovery could not be associated with any change in the Mg content of the herbage. The magnitude of the fall in plasma Mg conc. for individual animals varied to such an extent that no effect of manurial treatment of pastures on this reaction could be demonstrated. Plasma Na concentrations fell over the first 2 weeks of grazing and then rose again, whilst red blood cell Na conc. rose immediately after the animals were turned out to graze and thereafter gradually returned towards the pre-grazing concentrations. No significant changes in the plasma Ca and K concentrations or the blood cell K conc. were found. The packed cell volumes fell in the second and third weeks and rose again slightly in the last week.

Concentrations of plasma Mg as low as 0.6 mg./100 ml. were found, in the presence of normal plasma Ca, K and Na concentrations, without the manifestation of any clinical signs of tetany. Analysis of blood samples taken from 3 field cases of grass tetany revealed reduced plasma concentrations of both Ca and Mg.

Although manurial treatments produced pastures which had extremely high protein

and potassium contents, no clinical cases of grass tetany occurred although certain animals were hypomagnesaemic.

Pross, E. (1961). Beitrag zur therapeutischen Beeinflussung der akuten Tympanie vom Typ der schaumigen Gärung beim Rind. [**Treatment of frothy bloat in cattle.**]—Tierärztl. Umsch. **16**, 274-278. 4066

Oral administration of silicone compounds was superior to parenteral injection of substances which stimulate parasympathetic activity. The literature is discussed.—E.G.

Haenel, H., Gerriets, E., Müller-Beuthow, W., Gassmann, B., Plessing, H., Grütte, F.-K. & Erhardt, V. (1961). Versuche mit Aureomycin in nutritiver, therapeutischer und überhöhter Dosierung an Hühnerküken. [**Experiments in chicks with dietary chlortetracycline at supplementary, therapeutic and excessive doses.**]—Arch. Geflügelk. **25**, 179-206. [Summary in English.] 4067

Six groups, each of 100 chicks, were fed for 8 weeks a ration containing 0, 10, 100, 1,000, 5,000 or 10,000 p.p.m. chlortetracycline. The control group showed nutritional disorders and symptoms of vitamin A and D deficiency, from which the other groups were free. The best growth and food conversion rates were seen in the group fed 1,000 p.p.m. There was a temporary depression of growth in the groups fed 5,000 and 10,000 p.p.m., but no other adverse effects. No differences were found between any of the groups in the bacterial populations of the small intestine and caecum, or between treated groups in the vitamin content and weight of the liver. Because of the possible development of resistant pathogens, levels higher than 100 p.p.m. should be restricted to therapeutic use.—M.G.G.

Hale, W. H., Sherman, W. C., Reynolds, W. M. & Luther, H. G. (1961). **The value of certain steroidal sapogenins in rations of fattening lambs and cattle.**—Proc. Soc. exp. Biol., N.Y. **106**, 486-489. 4068

A study was made of growth rate, feed efficiency and carcass quality in fattening lambs and steers fed plant steroidal sapogenins, saponins and a natural source of unisolated sapogenins. Lambs fed smilagenin (isolated from *Agave lecheguilla*) showed considerably improved weight gains and food efficiency especially when fed at the level of 8 g. per ton total food, and similar results were obtained when ground *Agave lecheguilla*

was fed in amounts equivalent to 8 g./ton of smilagenin. Sarsasapogenin and hecogenin at 8 g./ton gave comparable results to the smilagenin but diosgenin and tigogenin did not improve performance.

Steers fed 20 mg. of smilagenin daily showed weight gains similar to those of animals receiving 10 mg. stilboestrol daily.

—E. J. CASTLE.

Hatemi, N. & McCance, R. A. (1961). **The response of piglets to ammonium chloride.**—J. Physiol. **157**, 603-610. [Authors' summary modified.] 4069

Ammonium chloride was administered to piglets 1-2 days old and to animals 10-12 weeks old weighing about 15 kg. In both groups the average pH of the urine rose and did not regain its initial level for 5-6 hr. In new-born animals the excretion of phosphates was at all times negligible and that of NH_3 did not increase significantly after giving the chloride. In older animals the excretion of phosphates fell but that of NH_3 rose significantly.

In new-born animals the chloride increased the excretion of potassium but not sodium. In older animals the excretion of both cations was increased.

Travis, H. F. & Schaible, P. J. (1961). **Effect of dietary fat levels upon reproductive performance of mink.**—Quart. Bull. Mich. agric. Exp. Sta. **43**, 518-521. [Authors' summary modified.] 4070

The authors studied 523 adult and young mink during two reproductive cycles to determine the effects of dietary fat. Diets with fat concentrations ranging from 23-44% of dry constituents gave similar results during breeding, gestation, parturition and early kit growth. Food consumption decreased as the fat concentration increased. It was concluded that fat concentration in the diet need not be as low as thought necessary by mink farmers, provided that the fat is of high quality.

Utzmöller, P. (1961). **A study of mineral nutrition in cattle under the conditions of an underdeveloped region.** pp. 81. Amsterdam: Koninklijk Instituut voor de Tropen. [Thesis, Utrecht.] [In English.] 4071

Results of a survey, of the Amazon Valley with the aid of FAO, the Brazilian authorities, the Netherlands "Hoorn" Institute for Animal Nutrition and the Institute for Tropical and Protozoal Diseases of the Veterinary Faculty of Utrecht, indicated

grave mineral deficiencies, particularly among cattle. Details were given of studies on several selected farms of soil, herbage, serum, liver biopsy, urine and hair samples, together with management methods. A cattle disease locally known as "mal de cai", resulting in sudden death, was probably the result of Na and K deficiency, combined with an imbalance of Ca, P and Mg. A condition characterized by nasal or conjunctival discharge was common in cattle grazing for prolonged periods in upland savannahs, deficient in Co. There was also Cu deficiency characterized by anaemia; brittleness of bones associated with lack of P; and posterior paralysis of unidentified aetiology. Mud eating is common among cattle. Control of these conditions is hampered by the lack of veterinarians and lack of laboratory facilities, inadequate transport and often unfavourable climate.—E.G.

Lampkin, G. H., Howard, D. A. & Burdin, M. L. (1961). **Studies on the production of beef from zebu cattle in East Africa. III. The value of feeding a phosphatic supplement.**—*J. agric. Sci.* 57, 39-47. [Authors' summary modified.] 4072

Dicalcium phosphate was fed as a phosphatic supplement to beef-type zebu cows and weaner calves grazing in the Kenya Highlands. The treatment caused an increase in the level of inorganic phosphate in the blood only during times of drought, when it also caused an improvement in the condition of the cows. A slight beneficial effect on fertility was noted throughout the experiment. Evidence was found that other nutritional factors were causing considerable variation and it is suggested that more attention should be given to improving the general level of nutrition of cattle during dry seasons.

Skerman, K. D., O'Halloran, M. W. & Munday, B. L. (1961). **The effect of cobalt bullets on milk production of dairy cattle.**—*Aust. vet. J.* 37, 181-184. [Authors' summary modified.] 4073

In an experiment using 26 matched pairs of cows in two herds grazing cobalt-deficient pastures on King Island, Tasmania, cobalt bullet treatment increased the mean production per lactation of fat-corrected (4%) milk by 1,150 lb. per cow in one herd and by 873 lb. per cow in the other. The mean concentration of vitamin B₁₂ in milk was higher in treated cows than in controls.

Fearn, J. T. & Habel, J. D. (1961). **Parenteral copper therapy for sheep in South Australia.**

—*Aust. vet. J.* 37, 224-226. [Authors' summary modified.] 4074

In typical copper-deficient country, both intravenous copper sulphate and subcutaneous copper glycinate proved efficacious in preventing the development of wool lesions. Copper glycinate appears to be a satisfactory and safe drug for use by the sheep owner. One to three injections a year of 45 mg. of copper either as the sulphate or as the glycinate should maintain adequate copper status.

Lucas, I. A. M., Livingstone, R. M. & McDonald, I. (1961). **Copper sulphate as a growth stimulant for pigs: effect of level and purity.**—*Anim. Prod.* 3, 111-119. 4075

Sixty-four pigs aged 8-9 weeks were divided into eight equal groups and fed the same basal diet until they reached approximately 200 lb. liveweight when most of them were slaughtered. Copper sulphate, either as a purified form (analytical reagent grade) or as a commercial grade was added to the diet at one of 4 levels: 16, 62, 125 or 250 p.p.m. Purity of copper sulphate did not affect growth rate, food conversion efficiency or carcass measurements. The copper sulphate only improved performance in pigs under 100 lb. liveweight and the most consistent increases in growth rate and food conversion occurred with levels of 125 and 250 p.p.m.

—E. J. CASTLE.

Walker, D. J., Harris, A. N. A., Farleigh, E. A., Setchell, B. P. & Littlejohns, I. R. (1961). **Muscular dystrophy in lambs in N.S.W.**—*Aust. vet. J.* 37, 172-175. [Authors' summary modified.] 4076

The condition reported in New South Wales resembled that described in New Zealand [*V.B.* 24, 1998; 28, 2596; 30, 3000]. Affected lambs were stiff and weak, and had characteristic gross and histological lesions in skeletal and sometimes cardiac musculature and greatly increased concentrations of glutamate oxalacetate transaminase in serum with no increase in bilirubin. The growth of lambs on one property (but not on another) responded to selenium treatment.

Blaxter, K. L., McCallum, E. S. R., Wilson, R. S., Sharman, G. A. M. & Donald, L. G. (1961). **Prevention of enzootic muscular dystrophy by selenium administration.**—*Proc. Nutr. Soc.* 20, No. 1 pp. vi-vii of Abstracts. 4077

Three of 4 groups of (204) beef calves

received selenium as sodium selenate. Animals were examined clinically at intervals, and serum glutamic oxaloacetic transaminase activity determined. Muscle creatine determinations confirmed the presence of dystrophy in calves that died. The results with selenium compared favourably with those of previous experiments in which α -tocopherol was given, and showed selenium to be effective in reducing the incidence of muscular dystrophy.

—E. J. CASTLE.

McAleese, D. M., Bell, M. C. & Forbes, R. M. (1961). **Magnesium-28 studies in lambs.**—*J. Nutr.* 74, 505-513. 4078

Magnesium-deficient and healthy lambs were dosed orally or intravenously with Mg^{28} . Distribution of the isotope in the various tissues was measured in addition to its rate of disappearance from plasma and whole blood. The excretory pathways were investigated.—R.M.

Smith, R. H. (1961). **Importance of magnesium in the control of plasma calcium in the calf.**—*Nature*, Lond. 191, 181-182. 4079

Calves fed an all-milk diet for a long time, but receiving low levels of vitamin D, can become both hypocalcaemic and hypomagnesaemic. Calcium balances were conducted on four of these calves, 4-5 months old, both before and after magnesium supplementation. Although calcium absorption was decreased and calcium excretion increased after the magnesium supplementation, the plasma calcium and magnesium rose to normal levels.—E. J. CASTLE.

Riser, W. H. (1961). **Juvenile osteoporosis (osteogenesis imperfecta) — a calcium deficiency.**—*J. Amer. vet. med. Ass.* 139, 117-119. 4080

The author gives a brief account of an osteopathy in young domestic and zoo feline and canine animals. It is suggested that the term 'osteogenesis imperfecta' for this condition be replaced by that of 'juvenile osteoporosis'. This disease, which is attributed to calcium deficiency, is evidently identical with that described in lions by Fiennes & Graham-Jones [*V.B.* 31, 1215] to which the generally accepted term 'osteodystrophia fibrosa' was applied. The author is correct in discarding the term 'osteogenesis imperfecta' in relation to this condition, but the paper contributes no new knowledge of this disease.—R. N. FIENNES.

Nordin, B. E. C. (1961). **The pathogenesis of osteoporosis.**—*Lancet*, May 13th, 1011-1014 & 1015. 4081

Because the essential feature is a reduction in bone mass, osteoporosis could be due to a diminished rate of new bone formation, an increased rate of resorption, or a combination of the two. A possible cause of increased bone resorption is long-continued negative calcium balance and, using illustrative cases, the author suggested this could be the cause of primary osteoporosis in man.—E.V.L.

Smith, H. & Taylor, J. H. (1961). **Effect of feeding two levels of dietary calcium on the growth of broiler chickens.**—*Nature*, Lond. 190, 1200. 4082

Two levels of calcium in the diet of broiler chickens from birth to 10 weeks of age were compared. Average liveweight gain, food consumption and food conversion efficiency were significantly higher in the chickens receiving 0.83% calcium in the diet than in the group receiving 1.35%.

—E. J. CASTLE.

Abrams, J. T., Bridge, P. S., Palmer, A. C., Spratling, F. R. & Sharman, I. M. (1961). **Apparent hypovitaminosis A in young cattle in East Anglia.**—*Vet. Rec.* 73, 683-690 & 691. [Authors' summary modified.] 4083

Cattle kept in a yard were well-grown and well-fed, chiefly on home-grown foods, including cereals, dried sugar-beet pulp, straw and hay, but with limited access to green foods or other source of carotene or vitamin A. Some became blind with exophthalmos, lacrimation, and dilated pupils (with visible tapeta lucida). Other signs included nasal discharge, coughing, scouring and oedema. Less severely affected animals responded to vitamin A therapy.

Optic nerves from 4 of the animals were constricted as they traversed the optic canal; there was loss of myelin and axons, and a proliferation of abnormal astrocytes.

In this, the first clinical account of vitamin A deficiency in British cattle, attention is drawn to the increasing likelihood of the deficiency occurring under modern intensive systems of husbandry, especially when home-grown foods are used extensively.

Palludan, B. (1961). **The teratogenic effect of vitamin A deficiency in pigs.**—*Acta vet. scand.* 2, 32-59. [In English. Summaries in German and Danish. Author's summary modified.] 4084

Nine sows and gilts which throughout pregnancy or in the first third of it were depleted of vitamin A gave birth to 91 piglets all of which had malformations. The most frequent was microphthalmia; others were heart defects, diaphragmatic hernia, malformed and not ascended kidneys, underdevelopment of genital organs, internal hydrocephalus and herniations of the spinal cord. Of these malformations, only the last mentioned seems to be specific for vitamin A deficiency. This malformation may be due to retarded growth of the bone tissue in relation to the relatively normal growth of the nerve tissue.

Almejew, C. (1961). *Enzootische Dystrophie der Herz- und Skelettmuskulatur (Weissmuskelerkrankheit) der Lämmer. [Enzootic dystrophy of heart and skeletal muscles (white muscle disease) in lambs.]* — Dtsch. tierärztl. Wschr. 68, 302-305. [Summary in English.] 4085

An outbreak of white muscle disease in lambs was prevented from recurring at the next lambing season by improvement of the diet of the flock, with particular regard to the vitamin E and mineral content. The clinical, P.M. and histological findings were described. —M.G.G.

Jarrett, I. G. & Filsell, O. H. (1961). *An effect of glucose on acetate metabolism in sheep.* — Nature, Lond. 190, 1114-1115. 4086

See also absts. 3857 (effect of dietary fat and vitamin A on TB. in chicks); 3858 (serum protein and lipoprotein response to TB. in chicks fed various levels of fat).

The rate of disappearance of acetate from the blood of six 2-year-old Merino wethers was estimated before and after a glucose injection (1 g./kg.). The sheep had been fed wheat hay chaff for 8 weeks previously, and two of them also received lucerne hay chaff for 2 days before the estimations were made. Administration of glucose was followed by a more rapid removal of acetate from the blood than normal. Rates of acetate disappearance were highest in the sheep fed lucerne.

—E. J. CASTLE.

Gründer, H.-D. (1961). *Die Dauertropfinfusion beim Rind. II. Behandlung der Azetonurie. [Intravenous drip infusion in cattle. II. Treatment of ketosis.]* — Dtsch. tierärztl. Wschr. 68, 401-405. [Summary in English.] 4087

Intravenous drip infusion of 10% solution of glucose at the rate of 3 litres in 24 hours cured ketosis in 33 of 42 dairy cows in one to three days.—E.V.L.

Newton, W. M. (1961). *Ketosis in swine.* — Illinois Vet. 4, 33-35. 4088

A condition in farrowing sows, which clinically and pathologically resembled ketosis of cows and ewes, was believed to be due to sudden depletion of liver glycogen reserves, resulting in hypoglycaemia, increased ketone production and eventually ketosis.—E.G.

DISEASES, GENERAL

Anon. (1961). *FAO/OIE Animal Health Year Book for 1960.* pp. 311+viii. Rome: Food and Agriculture Organization. Paris: Office International des Epizooties. 15s. [In English, French and Spanish.] 4089

This year's edition is bigger and better than the four preceding editions. Information on the disease situation in 136 countries, (including for the first time the U.S.S.R., China, Mongolia and Bolivia), occupies 203 pages. In addition there are sections on diseases of bees and fish, numbers of livestock and veterinarians, and ten special articles which include one on major changes in the livestock disease position in 1960 and others on foot and mouth disease, contagious bovine pleuropneumonia and African horse sickness. This yearbook has now attained a high degree of perfection and comprehension. It may be

purchased from FAO sales agents in various countries (H.M. Stationery Office in the United Kingdom).—R.M.

Andrade dos Santos, J. & Tokarnia, C. H. (1960). *Algumas observações sobre a patologia de animais selvagens em cativeiro. [Diseases of wild animals held in captivity.]* — Arq. Inst. Biol. Anim., Rio de J. 3, 1-24. [Summary in English.] 4090

The authors recorded tuberculosis in monkeys, a coati (*Nasua* sp.) and a lion; rabies in a jaguar; neoplasms in elephant, jaguar, monkey and lion.—R.M.

Backhouse, T. C. & Bolliger, A. (1961). *Morbidity and mortality in the koala (Phascolarctos cinereus).* — Aust. J. Zool. 9, 24-37. [Abst. from authors' summary.] 4091

Twenty-eight koalas, 26 of which had died exclusively from natural causes, were examined P.M. The probable causes of death and the numbers of cases involved were: different forms of pneumonia (6) including 2 where the primary lesion was trauma; hepatitis with suppurative cholangitis (3); infection with *Cryptococcus neoformans* (3); lymphoblastic leukaemia and an anaemia of unknown origin (2); cystic disease of the ovary complicated by infection (4); middle ear sepsis, ulcerative colitis, and cardiac failure associated with senility (1 each). In the remaining 7 cases the cause of death was indeterminate, though senility was the probable cause in 2. Two additional cases of cystic disease of the ovary occurred.

Heidrich, H. J. (1961). Die Reisetetanien des Rindes in meteorobiologischer Sicht. [**Meteorobiological aspects of transport tetany in cattle.**] — Berl. Münch. tierärztl. Wschr. 74, 274-276. [Summary in English.] 4092

Weather conditions over a year were related to 112 cases of transport tetany; no connexion was found with temperature but a significantly high number of cases occurred in periods immediately before worsening conditions.—E.V.L.

Bezeau, L. M., Bailey, C. B. & Slen, S. B. (1961). **Silica urolithiasis in beef cattle. IV. The relationship between the pH and buffering capacity of the ash of certain feeds, pH of the urine, and urolithiasis.** — Canad. J. Anim. Sci. 41, 49-54. [Authors' abstr. modified.] 4093

Twenty-one feeds and four chemical compounds were fed to calves and the urine pH was recorded. Twelve of the feeds produced acid urine.

Four calves were fed for 6 months on rations designed to produce either an acid or alkaline urine. Siliceous urinary calculi developed in all calves. Urine pH by itself did not seem to be a factor in the incidence of silica urolithiasis.

Cornelius, C. E. & Bishop, J. A. (1961). **Ruminant urolithiasis. III. Comparative studies on the structure of urinary concretions in several species.** — J. Urol. 85, 842-848. [Authors' summary modified.] 4094

The gross and microscopic anatomy of calculous materials recovered from dogs, cattle, and sheep has been described. A close anatomical similarity in matrix-crystal inter-relationships was found to exist between

canine and human uroliths. Demineralized matrices of both canine and ruminant phosphatic calculous material revealed an intimate relationship between both mineral and matrix. The presence and importance of matrix in the formation of calculi in domestic animals is histochemically substantiated.

Santiago Luque, J. M. & Palacios Remondo, J. (1960). Estudio clínico y anatomopatológico de la hepatodistrofia tóxica del cerdo. [**Symptoms and lesions of toxic liver dystrophy of pigs.**]—An. Inst. Invest. vet., Madrid 10, 33-46. [Summaries in English, French and German.] 4095

Toxic liver dystrophy was studied in 3 lots of 7, 3 and 2 pigs. All had died within a month of weaning. Three had shown staggering and weakness, the others had died suddenly. The only specific lesions were seen in the liver, which in most cases had a mosaic appearance. Histological examination revealed 4 successive phases of the disease: oedema of Disse's spaces, vacuolar and hydropic degeneration of the cytoplasm, necrobiosis, and lobular haemorrhage.—M.G.G.

Bollwahn, W. (1961). Über Stressreaktionen und ihre Therapie beim Schwein. [**Stress reactions and their treatment in pigs.**] — Tierärztl. Umsch. 16, 266-271. 4096

Corticotrophin treatment was advocated for the prevention of post-operative shock, indigestion and acute stress in pigs. The adaptation syndrome in general was discussed.—E.G.

Douglas, S. W. & Palmer, A. C. (1961). **Idiopathic demyelination of brain-stem and cord in a miniature Poodle puppy.** — J. Path. Bact. 82, 67-71. [Authors' summary modified.] 4097

This paper describes the clinical and pathological features of a demyelinating disease in a 9-week-old puppy, with a progressive quadriplegia. Severe demyelination occurred in the tegmentum and cord; smaller foci were present bilaterally elsewhere in the brain. Nerve cells in the malacic regions were on the whole well preserved. Similar cases in Poodles have been described in North America. The cause of the disease is unknown.

Varachiu, N., Sălăgeanu, G., Solnițchi, A. & Ionescu, A. (1960). Modificările anatomopatologice în urma injectării suspensiilor de creier homolog la câine. [**Organ lesions pro-**

duced in dogs by intravenous injection of homologous brain suspension.]—*Lucr. Inst. Agron. București Ser. C, No. 4* pp. 199-209. [In Roumanian. Summaries in French and Russian.] 4098

Haemorrhagic and degenerative lesions developed in 55 dogs following i/v injection of homologous brain tissue suspension. They were most frequent and most severe in the intestinal mucosa, the liver, the kidneys and the spleen, but they were also observed in the c.n.s., eyes, heart, lungs, stomach, adrenals and bladder.—E.G.

Marthedal, H. E. & Velling, G. (1961). **Haemorrhagic syndrome in poultry.**—*Brit. vet. J.* 117, 357-365. [Authors' summary modified.] 4099

The disease designated in the literature "haemorrhagic syndrome" or "haemorrhagic disease" is briefly reviewed, with special reference to its occurrence in Denmark. Since 1954 there has been a constant increase in the number of outbreaks recorded and in 1960 the disease was diagnosed in 317 cases (5.2% of the total number of consignments of poultry submitted for autopsy). In some cases pronounced sero-haemorrhagic exudation under the skin of wings and legs and in breast muscles have been noted.

Rigdon, R. H., Ferguson, T. M. & Couch, J. R. (1961). **Spontaneous occurring muscular necroses and encephalomalacia in the turkey.**—*Poult. Sci.* 40, 766-771. [Authors' summary modified.] 4100

In a group of 34 turkeys focal areas of necrosis were present in striated muscles throughout the body, their extent varying in different anatomical sites of the same bird, as well as in different birds. A second, rarer lesion was encephalomalacia. Some turkeys developed paralysis, pendulous crop, or an enlarged tibio-metatarsal joint. The aetiology of the lesions in the striated muscle and in the brain is discussed.

Rothe, W. E. & Grenan, M. M. (1961). **Radio-protection by mitotic inhibitors and mercapto-ethylamine.**—*Science* 133, 888. [Authors' summary.] 4101

In the mouse, chemical interference with cellular proliferation alters the radiosensitivity of the bone marrow, and this results in protection from otherwise lethal X-irradiation. When intestinal damage is minimized by appropriate timing and dosage, many mitotic inhibitors increase radio-

resistance and enhance the protective effects of mercaptoethylamine.

Shively, J. N., Andrews, H. L., Kurtz, H. J., Warner, A. R., Jr. & Woodward, K. T. (1961). **Radiosensitivity of swine from irradiated parentage.**—*Proc. Soc. exp. Biol., N.Y.* 107, 16-19. [Authors' summary modified.] 4102

The lethal doses of radiation for 12-week-old offspring from non-irradiated swine, from irradiated swine, and from an irradiated boar and non-irradiated sows were much the same, so were survival times for progeny of the different parents.

Lindop, P. J. & Rotblat, J. (1961). **Long-term effects of a single whole-body exposure of mice to ionizing radiations. I. Life-shortening. II. Causes of death.**—*Proc. roy. Soc. Ser. B.* 154, 332-349 & 350-368. 4103

The authors concluded that the reduction of life-span of mice irradiated with low doses (50 to 457 r) was due to acceleration of the usual causes of death, and not the induction by radiation of specific diseases. The probability of any one disease occurring remained the same in irradiated as in the control animals. In mice given high doses (549 to 780 r) a definite increase in incidence of neoplastic diseases was established.—R.M.

Barreira, F., Mendes, J. A. & Neves, E. M. (1960). **Determinação do radioestrôncio em ossos. I. Distribuição no esqueleto do ovino. [Determination of radiostrotrium in bones. I. Distribution in skeleton of sheep.]**—*Rev. Cienc. vet., Lisboa* 55, 282-284. [Summary in English.] 4104

The concentration of Sr^{90} varied greatly in the different parts of the skeleton of a sheep aged 18 months, ranging from 4 $\mu\mu\text{c./g.}$ of ash in the tarsus to 181 $\mu\mu\text{c./g.}$ in the anterior phalanx.—M.G.G.

Nowak, H. F. & Kucharski, J. (1961). **Effect of polyvinyl alcohol on the distribution of iodine-131 in the internal organs, fluids and excreta of rabbits.**—*Nature, Lond.* 191, 665-667. 4105

When radio-iodine was dissolved in polyvinyl alcohol more was taken up by the thyroid, less was taken up by parenchymal organs, and it was excreted more rapidly in the urine, compared with solutions of the isotope in saline.—E.G.

Colombo, S. & Marazza, V. (1961). **Contributo alla conoscenza degli aneurismi coronarici del**

bovino e del cavallo. [**Coronary aneurysm in cattle and horses.**]—Clin. vet., Milano 84, 209-225. [Summaries in English and German.] 4106

An account of the pathology of seven cases in cattle and one in a horse.—R.M.

Czub, E. (1961). Die Herzfunktionen unter dem Einfluss von Calciumlösungen beim Rind. Elektrokardiographische Untersuchungen unter besonderer Berücksichtigung der Rhythmusstörungen. [**Cardiac function in cattle treated with calcium.**]—Dtsch. tierärztl. Wschr. 68, 298-301. [Summary in English.] 4107

Cattle given i/v infusions of calcium gluconate or calcium chloride developed bradycardia or sinoatrial block. If the Mg content of the CaCl_2 soln. was raised, extrasystoles and sinus tachycardia were observed. —M.G.G.

Kutas, F. & Karsai, F. (1961). **The diagnostic value of transaminase and cholinesterase determinations in hepatic disease of domestic animals.**—Acta vet. Acad. Sci. hung. 11, 277-288. [In English.] 4108

Hepatic degeneration was induced by oral administration of CCl_4 to cattle, horses and dogs. There was a rapid increase in the plasma transaminase level, reaching a peak in 2 to 3 days; fluctuations in plasma cholinesterase were insufficient for diagnostic purposes. The transaminase test was found

to be a sensitive indicator of the severity of acute hepatic diseases, but was less useful in chronic diseases.—E.V.L.

Cameron, G. R. & Hou, C. T. (1961). **The response of the intrahepatic bile-ducts to chemical injury.**—J. Path. Bact. 82, 95-107. [Authors' summary modified.] 4109

Regeneration of the intrahepatic bile-ducts after direct chemical injury is rapid and complete. Associated liver necrosis is periportal and peribular, and is caused chiefly by damage and thrombosis of the intrahepatic veins and arteries, although liver cells may be killed by the agents regurgitating into the sinusoids. Massive infarction of the corresponding liver lobes is a not infrequent complication. Cholangitis and cholangiolitis often develop, but the affected bile-ducts soon recover or occasionally pass into a stage of chronic obliterative inflammation.

Much bile-duct proliferation follows chemical injury and it may be mild or intense, transient or lasting according to co-existing factors. Repair includes a stage of fibrous band formation which mimics localized biliary cirrhosis, but which sooner or later undergoes complete resolution.

Hofmeyr, C. F. B. (1960). **Comparative dental pathology (with particular reference to caries and paradontal disease in the horse and the dog).**—J. S. Afr. vet. med. Ass. 31, 471-480. 4110

A general discussion.—R.M.

POISONS AND POISONING

Burden, E. H. W. J. (1961). **The toxicology of nitrates and nitrites with particular reference to the potability of water supplies. A review.**—Analyst 86, 429-433. 4111

B. discussed the literature on the lethal doses of nitrate and nitrite for various animals, including data from annual reports of the Government Analyst in Sudan which indicated that water containing 320 p.p.m. of nitrate nitrogen might prove fatal for cattle. —R.M.

I. Buntain, D. (1961). **Deaths in pigs on a high copper diet.**—Vet. Rec. 73, 707-713. 4112

II. Allcroft, R., Burns, K. N. & Lewis, G. (1961). **Effect of high levels of copper in rations for pigs.**—Ibid. 714-718. [Authors' summaries modified.] 4113

I. Serious losses in fattening pigs associated with the feeding of meal to which

a copper supplement had been added are described and discussed in relation to recorded cases of chronic copper poisoning. The dangerously high copper levels found in the liver and kidneys of all pigs examined together with some other unidentified toxic factor in the diet may have caused the losses.

II. Meals containing various levels of added copper sulphate were fed to pigs from weaning to bacon weight to study accumulation of Cu in tissues, development of toxic symptoms and effects on growth rate. No significant increase in live-weight gain was found on diets containing between 0.06 and 0.16% added copper sulphate. Additions of 0.2 and 0.4% reduced growth, caused jaundice and the death of 3 out of 7 pigs. Despite careful mixing, wide variations were found in the copper content of the meal at each level of supplementation.

Liver Cu increased sharply on diets containing more than 0.06% added copper sulphate (188 p.p.m. Cu) but no toxic symptoms were produced on levels up to 0.16% copper sulphate. Concentrations of 0.2 and 0.4% were toxic.

While the results suggest that a high content of Cu in the liver is not necessarily toxic by itself, it appears that above a certain liver concentration other factors may precipitate a syndrome attributable to Cu toxicity.

Todd, J. R. & Thompson, R. H. (1961).

Methaemoglobin in chronic copper poisoning of sheep.—*Nature*, Lond. 191, 89-90. 4114

Estimations in 3 affected sheep gave levels of blood copper 1,000 to 1,480 µg./100 ml. and methaemoglobin 3.5 to 3.8 g./100 ml. compared with 170 µg. and 0.1 g. respectively in normal sheep. The methaemoglobin was mainly intracorpuscular and it constituted 25 to 35% of the total haemoglobin.—E.V.L.

Watt, J. G. & Doxey, D. L. (1961). **A case of warfarin poisoning in a Labrador bitch.**—

Vet. Rec. 73, 548-551 & 552. [Authors' summary modified.] 4115

Warfarin poisoning was treated by exchange transfusion of whole blood and parenteral administration of water-soluble analogues of vitamin K, and the dog recovered.

Gallagher, C. H. (1960). **The effect of pyrrolizidine alkaloids on liver enzyme systems.**—

Biochem. Pharm. 3, 220-230. [Author's summary modified.] 4116

The pyrrolizidine alkaloids, lasiocarpine and heliotrine, inhibit enzyme systems which require pyridine nucleotides for electron transfer; they do not affect cytochrome oxidase activity and stimulate succinoxidase activity when mitochondria are suspended in 0.25 M sucrose. Neither alkaloid influenced the activity of L-malic dehydrogenase or succinoxidase in water-disrupted mitochondria. The effect on mitochondrial metabolism may be common to pyrrolizidine alkaloids generally. The relevance of this mode of action to the acute hepatotoxic effects of the pyrrolizidine alkaloids in animals is discussed.

Penny, R. H. C., David, J. E. & Wright, A. I.

(1961). **Heinz-Ehrlich bodies associated with kale feeding.**—*Vet. Rec.* 73, 747-748. 4117

In blood from a heifer with suspected

kale poisoning, 55% of the r.b.c. contained Heinz-Ehrlich bodies. The bodies were also found in the r.b.c. of 4 Friesian heifers fed 50 lb. kale daily for 3 months but not in the blood of four controls. One heifer became ill after one month of the kale feeding but recovered when kale feeding was stopped. The Heinz bodies disappeared slowly in all four heifers once kale feeding ceased.

—E. J. CASTLE.

—Carnaghan, R. B. A. & Sargeant, K. (1961).

The toxicity of certain ground nut meals to poultry.—*Vet. Rec.* 73, 726-727. 4118

During the first 6 months of 1961 thirty-seven outbreaks of so-called 'X' disease in young turkeys, ducklings and pheasant chicks, were diagnosed at Weybridge. Diagnosis was based on the presence of microscopic liver lesions. Where details of the rations fed were known Indian ground-nut meal was found to be a constituent. In experiments in which samples of these rations and extracts of the Indian meal were fed to ducklings, it was shown that the Indian meal contained a toxic principle similar to that found in Brazilian and East African samples, although the toxicity was less.—E. J. CASTLE.

Grinnell, E. H., Johnson, J. R., Rhone, J. R., Tillotson, A., Noffsinger, J. & Huffman, M. N. (1961). **Oestrogen protection against acute digitalis toxicity in dogs.**—*Nature*, Lond. 190, 1117-1118. 4119

Tests on 5 ovariectomized dogs indicated considerable protection by the steroid 1, 3, 5, (10), 16-oestratetraen-3-ol methyl ether against digitalis toxicity.—E.V.L.

Evans, W. C., Evans, I. A., Axford, R. F. E., Threlfall, G., Humphreys, D. A. & Thomas, A. J. (1961). **Studies on bracken poisoning in cattle. VII. The toxicity of bracken rhizomes.**—*Vet. Rec.* 73, 852 & 853. [Authors' summary modified.] 4120

Bracken rhizomes if eaten by cattle can cause bracken poisoning. The toxic factor is present in the rhizomes in at least 5 times the concentration which normally occurs in the fronds. Stock should be denied access to ploughed bracken-land containing appreciable quantities of exposed rhizomes.

Adler, J. H. & Egyed, M. (1961). **[Trigonella foenum-graecum poisoning in sheep.]**—*Refuah vet.* 18, 20-21. [In Hebrew. In English p. 45.] 4121

The condition was diagnosed in 4 large

flocks and in a number of individual sheep owned by smallholders. The clinical signs were in general similar to those reported in cattle [see *V.B.* 29, 3272]. Respiratory distress and cardiac arrhythmia were also noted. P.M. examination of a slaughtered sheep revealed ascites, s/c oedema, hydro-pericardium, and mild parenchymatous degeneration in the liver. The condition was reproduced experimentally in 11–20 days in 2 sheep fed exclusively on *T. foenum-graecum* straw. After 2 months on this ration, they were returned to a normal diet and recovered after 2 and 6 months.—M.G.G.

Gardiner, M. R. (1961). **Lupinosis—an iron storage disease of sheep.**—Aust. vet. J. 37, 135–140. 4122

Development of microscopic lesions in the livers of sheep fed lupins is described in detail. The stalks were the most toxic part of the plant. After several weeks of feeding on lupins abnormally high concentrations of iron were found in the serum and, particularly, in the liver of sheep. Liver copper was also increased whereas the concentrations of cobalt, vitamin B₁₂ and folic acid in the liver were reduced. Serum levels of glutamic oxaloacetic transaminase, alkaline phosphatase and bilirubin are raised in lupinosis. Leucopenia is a consistent accompaniment of the disease. Lupinosis appears to increase susceptibility to infestation with *Haemonchus contortus* and also alters the ruminal population of micro-organisms.—C. H. GALLAGHER.

Hackbarth, J. (1961). **Lupinosis in the light of old and new evidence.**—J. Aust. Inst. agric. Sci. 27, 61–67. [Author's summary.] 4123

Evidence is presented that lupin alkaloids are the cause of lupinosis. Administration of lupin alkaloids to experimental animals has given variable results, but the effects produced have been sufficient to account for lupinosis symptoms as they occur in the field. Strong support for this conclusion comes from the fact that in no recorded case have "sweet" (low alkaloid) lupins ever caused lupinosis.

The evidence refutes any hypotheses that lupinosis is caused by amino-acid deficiencies or overfeeding with protein. Nor has recent work supported the theory that a special toxin, or "ictogen", must be present apart from the alkaloids. If such a substance exists, its origin must be dependent on the presence of a high alkaloid content.

It is concluded that the best way of

avoiding lupinosis lies in the use of sweet lupin varieties.

I. Döbereiner, J., Tokarnia, C. H. & Canella, C. F. C. (1960). Intoxicação experimental pela "salsa" (*Ipomoea asarifolia* R et Schult.) em ruminantes. [Experimental poisoning by *Ipomoea asarifolia* in ruminants.]—Arq. Inst. Biol. Anim., Rio de J. 3, 39–57. 4124

II. Tokarnia, C. H., Döbereiner, J. & Canella, C. F. C. (1960). Estudo experimental sobre a toxidez do "canudo" (*Ipomoea fistulosa* Mart.) em ruminantes. [Toxicity of *Ipomoea fistulosa* in ruminants.]—Arq. Inst. Biol. Anim., Rio de J. 3, 59–71. 4125

III. Tokarnia, C. H., Canella, C. F. C. & Döbereiner, J. (1960). Intoxicação experimental pela fava da "timbaúba" (*Enterolobium contortisiliquum* (Vell.) Morong.) em bovinos. [Experimental poisoning of cattle by the fruit of *Enterolobium contortisiliquum*.]—Arq. Inst. Biol. Anim., Rio de J. 3, 73–81. [English summaries modified.] 4126

I. These studies consisted of administration of fresh "salsa" plant to cattle, sheep and goats, with clinical observations, and the gross and microscopic examinations of the organs of the animals which died. It induced nervous symptoms in all three species. The authors found no lesions which could be ascribed to ingestion of the plant. The histopathological findings consisted of slight hyperaemia and small haemorrhages in the central nervous system and more pronounced hyperaemia in the kidneys.

II. The plant *Ipomoea fistulosa* is called "canudo". Three oxen, five sheep and three goats were fed during long periods with the plant. Cattle developed progressive weakness, became languid and the coat became rough. One was killed *in extremis* after having been in the experiment for 90 days. The other two cattle were discharged after having been fed 96 days with the plant.

Sheep showed lack of appetite for "canudo", and listlessness; they died after between 29 and 81 days and after having been sick for 2 to 14 days.

The goats showed well defined nervous symptoms. One goat died on the 38th day of being fed with "canudo" and after having shown symptoms for three days; a second showed symptoms on the 46th day but did not die. The third goat refused to eat the plant.

Gross lesions in the ox consisted in an accentuated oedema of the abomasal mucosa, petechial haemorrhages in the first portion of

the small intestine, and thickening of the mucosa of the second part of the small intestine. Histopathological studies revealed lymphocytic infiltration and oedema in the mucosa and submucosa of the intestine. In the other animals only minor alterations were found, which could not be ascribed to the ingestion of the plant.

III. In cattle, ingestion of fruit of the "timbauba-tree" caused loss of appetite, lassitude, sometimes foul smelling diarrhoea or other digestive disorders and sinking of the eyeballs, causing death when a certain amount was ingested, within hours or days. Amounts not causing death, when repeated, initially caused symptoms, which in succeeding days disappeared. Cattle which already had ingested various amounts of the fruits, reacted less severely or more slowly after one more dose.

Lesions consisted of liver degeneration in a few cases and discrete kidney changes in all of them.

Bull, L. B. (1961). **Liver diseases in livestock from intake of hepatotoxic substances.**—Aust. vet. J. 37, 126-130. 4127

The botanical and geographical origin of pyrrolizidine alkaloids and their relationship to liver disease in livestock is discussed. References are included to historical, observational and experimental studies with pyrrolizidine alkaloids from a variety of plants. Particular attention is given to *Heliotropium* poisoning in sheep and cattle in Australia and to discussion of the pathology of pyrrolizidine alkaloid hepatitis. Brief reference is made to carbon tetrachloride poisoning of sheep, facial eczema of sheep and cattle, lupinosis of sheep, *Lantana* poisoning in cattle, selenium poisoning, and gossypol poisoning of pigs. Attention is drawn to occasional outbreaks of liver disease of undetermined aetiology in sheep in Australia and to the variation in susceptibility to hepatotoxins between species.—C. H. GALLAGHER.

Allen, M. R. & Kitts, W. D. (1961). **The effect of yellow pine (*Pinus ponderosa* Laws) needles on the reproductivity of the laboratory female mouse.**—Canad. J. Anim. Sci. 41, 1-8. [Authors' abst. modified.] 4128

An aqueous fraction of yellow pine needles contains a factor that depresses the uterine weight of immature mice; an ether fraction contains a toxic compound. Toxicity varies from month to month and was greatest in needles collected during winter. Both

aqueous and ether extracts depressed the metabolism of newly-weaned mice for up to 8 hours after administration. Both caused embryonic mortality and reduced foetus weight. In addition, the parent liquor appeared to be responsible for a decrease of the uptake of I^{131} by the thyroid gland.

Swarbrick, O. (1961). **Sulphaquinoxoline toxicity in day-old chicks.**—Vet. Rec. 73, 645-646. [Author's summary modified.] 4129

Serious mortality in day-old chicks was associated with the unnecessary use of sulphaquinoxoline.

McCarthy, P. H. (1961). **D.D.T. poisoning in young kangaroos (*Macropus* spp.).**—Aust. vet. J. 37, 202. 4130

Two young kangaroos, treated with 1% DDT, died following attacks of convulsions soon after dipping.—A. CULEY.

Long, W. H., Newsom, L. D. & Mullins, A. M. (1961). **Endrin residues in the fat of lambs grazed on endrin-treated pasture.**—J. econ. Ent. 54, 605-606. 4131

Granules containing 2% endrin were distributed over pasture at the rate of 0.5 lb. endrin per acre, as though for the treatment of sugar-cane borer. Lambs in poor condition were allowed to graze the treated pasture for 55 days and then transferred to untreated pasture for a further 42 days. P.M. fat samples were taken at the change over and 14 and 42 days afterwards. Fat was graded as 'external' (superficial) or 'internal' (from near stomach or in thoracic cavity), and contained the following amounts of endrin in parts per million at changeover: 18-23 (internal), 11-14 (external). After 14 days on clean pasture: 20-24, 15-20; after 42 days: 9-14, 6-11. Thus, more endrin accumulated in the internal than in the external fat, and even six weeks' feeding on untreated pasture failed to lower the endrin content very much.—W. N. BEESLEY.

Cavanagh, J. B., Davies, D. R., Holland, P. & Lancaster, M. (1961). **Comparison of the functional effects of dyflos, tri-o-cresyl phosphate and tri-p-ethylphenyl phosphate in chickens.**—Brit. J. Pharmacol. 17, 21-27. [Authors' abst. modified.] 4132

Tri-p-ethylphenyl phosphate is unique amongst the neurotoxic organophosphorus compounds in not being an inhibitor of cholinesterase. The dysfunction it produces is also unusual: it produces a characteristic

high-stepping gait which develops at varying periods after i/m inj. but more regularly following oral administration. The character, onset and development of the toxic effects of diisopropyl phosphorofluoridate (dyflos), and

tri-o-cresyl phosphate differ from those of tri-p-ethylphenyl phosphate. The different action of the latter was supported by histological evidence.

See also abst. 4211 (report, U.K.).

PHARMACOLOGY AND GENERAL THERAPEUTICS

(For treatment of specific infections see under the appropriate disease)

Carlson, R. H., Swenson, M. J., Ward, G. M. & Booth, N. H. (1961). **Effects of intramuscular injections of iron-dextran in new-born lambs and calves.**—J. Amer. vet. med. Ass. 139, 457-461. [Authors' summary modified.] 4133

Three ml. of iron-dextran containing 150 mg. of elemental iron, injected i/m into new-born lambs, changed the packed cell volume and haemoglobin level within a week, and the effects lasted for 4 weeks. Treated lambs were heavier at 8 and 12 weeks of age than untreated controls.

New-born calves injected with 24 ml. of iron-dextran (1.2 g. of elemental iron) per 100 lb. of body weight responded similarly.

A suggested dose for i/m inj. of iron-dextran for new-born calves and lambs was 12 mg. of elemental iron per pound of body weight. A second injection may be indicated at 4 to 6 weeks of age if other adequate sources are not available.

Andersson, N. S. E. (1961). **Clinical investigations on a new intramuscular haematinic.**—Brit. med. J. July 29th, 275-279. [Author's summary modified.] 4134

A preparation containing an iron-sorbitol-citric-acid complex ("Jectofer") and intended for intramuscular injection has been studied from the aspects of tolerance and therapeutic effect in 39 cases. It was compared with iron-dextran ("Imferon") (34 cases). The clinical tolerance for the iron-sorbitol complex was good, and only mild local side-effects were noted. The therapeutic result was satisfactory. About 60% of the iron in the preparation was utilized and about 30% of the dose was excreted in the urine without noticeable effect on renal function.

Archer, R. K. & Franks, D. (1961). **Blood transfusion in veterinary practice.**—Vet. Rec. 73, 657-660 & 661. [Authors' summary modified.] 4135

Blood transfusion is a potentially dangerous operation and should only be

performed when it is indicated. In most animal species, a single transfusion without regard to cross-matching is usually safe provided the recipient has never before had a transfusion. Repeated transfusions are potentially dangerous without cross-matching.

The infusion of saline is not much use (except in continued emesis) since it is excreted very rapidly. Plasma volume expanders, such as the dextrans, may be useful in certain species when the blood becomes concentrated. There is no equivalent of the human ABO blood group system in animals and there is no useful test for incompatibility which can be employed unless laboratory facilities are available.

Powers, T. E. (1960). **The transfer of antibiotics from the blood to milk in the isolated perfused caprine mammary gland.**—Dissertation, Ohio pp. 239. [Abst. from Diss. Abstr. 21, 2323 (1961).] 4136

Antibiotic levels of potassium benzylpenicillin, procaine benzylpenicillin, dihydrostreptomycin sulphate, and the tetracycline group were determined at hourly intervals for the blood perfusate as well as for the milk formed during the perfusion.

The period of time of perfusion required for the milk concentration to equal the plasma concentration indicated the relative rates of transfer. This rate was most rapid with the tetracycline group, followed by procaine benzylpenicillin, then potassium benzylpenicillin and dihydrostreptomycin sulphate.

Perfusion results were compared with antibiotic levels in live animals. The relative concentration of the different antibiotics in the milk of the live animal following parenteral therapy could be predicted by using the formula obtained for perfusion curves.

Hanson, D. J. (1961). **Local toxic effects of broad-spectrum antibiotics following injection.**—Antibiot. & Chemother. 11, 390-404. [Summary in Spanish pp. 419-420. Author's summary modified.] 4137

The local tissue changes in rabbits resulting from s/c and i/m injections of broad-spectrum antibiotics are reported. Chloramphenicol succinate and tetracycline produced the most severe necrosis. Oxytetracycline reconstituted, and whether in water or in propylene glycol, produced the least necrosis.

Tetracycline produced the greatest polymorphonuclear infiltration. Extravasated red blood cells were most prominent with chloramphenicol and tetracycline. Mononuclear cell infiltration was of a similar degree in all subcutaneous injections, but in intramuscular areas it was seen in the greatest degree with tetracycline and chloramphenicol. Thromboses of subcutaneous vessels and sloughs of the skin over the injection sites were most frequent with tetracycline and chloramphenicol.

Nerve changes following i/m inj. were studied for tetracycline and oxytetracycline only: only minimal degrees of nerve damage were found, with epineural inflammatory cell infiltrations, directly related to the severity of the general inflammatory response of the surrounding muscle.

Shelton, D. C. & Olson, N. O. (1961). **Effect of terephthalic acid on the activity of chlorotetracycline and oxytetracycline.** — *Avian Diseases* 5, 25-31. [Authors' summary modified.] 4138

Twelve groups of 15 chicks each were placed on treated feeds one week prior to inoculation with the synovitis agent. Chlorotetracycline was twice as effective as oxytetracycline. Terephthalic acid (0.5%) potentiated chlorotetracycline 4 times and oxytetracycline 2 times. Weight gains and feed conversion data were essentially normal when treatment prevented systemic infection.

McDonald, M. W. & Beilharz, R. G. (1961). **Effect of furazolidone on growth of chickens.** — *Aust. vet. J.* 37, 185-187. [Authors' summary modified.] 4139

Furazolidone was fed to chickens at levels of nil, 0.02%, 0.04% and 0.06% over 7 days. Supplementation with 0.02% increased growth but higher levels depressed growth and feed consumption increased.

Feeding 0.04% furazolidone from hatching depressed weight at four weeks of age. It had no effect on calcification of the tibia. It was recommended that furazolidone at the curative level (0.04%) be restricted to the shortest practical period of feeding.

Wilkins, J. H. (1961). **The effect of a new analgesic induction agent on goats.** — *Vet. Rec.* 73, 767-768. 4140

I/m inj. of doses of 0.5-16 mg./kg. body wt. of "Sernyl" [1-(1-phenyl cyclohexyl) piperidine monohydrochloride], an analgesic used in human medicine, produced satisfactory analgesia and was well tolerated by goats. It did not cause cardiovascular and respiratory depression, and acted within 1-10 min. according to dosage.—E.G.

Kaemmerer, K. (1961). Laborversuche zur Potenzierungswirkung von Propionylpromazin. [Laboratory tests on the potentiating effect of propionylpromazine.] — *Vet.-med. Nachr.* No. 1 pp. 16-24. 4141

Propionylpromazine potentiated chloral hydrate or hexobarbitone anaesthesia in mice. —E.G.

Nathan, P. W. & Sears, T. A. (1961). **Some factors concerned in differential nerve block by local anaesthetics.** — *J. Physiol.* 157, 565-580. [Authors' summary modified.] 4142

The effects of local anaesthetics on conduction in myelinated and non-myelinated fibres of the spinal roots of the cat have been studied.

Smaller concentrations of anaesthetic are required to block small fibres than to block large fibres.

The minimum concentration of anaesthetic for blocking non-myelinated fibres also blocked the smaller myelinated fibres.

Still lower concentrations of anaesthetic blocked the very smallest myelinated fibres without blocking the group of non-myelinated fibres.

Pauling, L. (1961). **A molecular theory of general anaesthesia.** — *Science* 134, 15-21. [Author's conclusions modified.] 4143

The hydrate-microcrystal theory of anaesthesia by non-hydrogen-bonding agents differs from most earlier theories in that it involves primarily the interaction of the molecules of the anaesthetic agent with water molecules in the brain, rather than with molecules of lipids. The postulated formation of hydrate microcrystals similar in structure to known hydrate crystals of chloroform, xenon, and other anaesthetic agents as well as of the substances related to protein side chains, entrapping ions and electrically charged side chains of protein molecules in such a way as to decrease the energy of electric oscillations in the brain, provides a

rational explanation of the effect of the anaesthetic agents in causing loss of consciousness. The striking correlation between the narcotizing partial pressure of the anaesthetic agents and the partial pressure necessary to cause formation of hydrate crystals provides some support for the proposed theory, but it is recognized that any theory based upon attraction of the molecules of the anaesthetic agent for other molecules would show a similar correlation, inasmuch as the energy of intermolecular attraction is approximately proportional to the polarizability (mole refraction) of the molecules of the anaesthetic agent. The proposed theory is sufficiently detailed to permit many predictions to be made about the effect of anaesthetic agents in changing the properties of brain tissue and other substances, and it should be possible to carry out experiments that will disprove the theory or substantiate it,

Clifford, D. H., Stowe, C. M., Jr. & Good, A. L. (1961). **Pentobarbital anesthesia in lions with special reference to preanesthetic**

medication. — J. Amer. vet. med. Ass. 139, 111-116. 4144

The authors describe anaesthesia of five lions by pentobarbitone sodium, preceded by ataractics (promazine and meperidine). The ataractics facilitated restraint and assisted the action of pentobarbitone sodium. The recommended dose of meperidine is 11 mg./kg. body wt. and of promazine 4.4 to 9 mg./kg. Physiological estimations were made of blood, urine and temperature during anaesthesia. Pulse and respiratory rates were recorded at different stages. Of the five lions one died as the result of the anaesthetic and this was attributed to an excessive dose of meperidine at 22 mg./kg. combined with promazine at 4.4 mg./kg. In the other four lions surgical anaesthesia was induced and it was concluded that they would have survived, but all were destroyed before recovery. Work describing anaesthesia in wild animals is important because of its scarcity and this paper should be consulted in the original by those interested.

—R. N. FIENNES.

See also absts. 3848 (isoniazid in TB.); 3885 (failure of brucella to develop resistance to streptomycin); 3900 (chemotherapy of bact. infections in mice); 3907 (griseofulvin); 3911 (resistance of Nocardia to antibiotics); 3920 (trypanosomiasis); 3926-3930 (coccidiosis); 3936 (amicarbalide); 3940 (metronidazole); 4007-4017 (parasiticide); 4027-4036, 4041 & 4044-4046 (anthelmintics).

PHYSIOLOGY, ANATOMY AND BIOCHEMISTRY

Ingram, D. L., McLean, J. A. & Whittow, G. C. (1961). **Increase of evaporative loss of water from the skin of the ox in response to local heating of the hypothalamus.**—Nature, Lond. 191, 81-82. 4145

Three Ayrshire bull calves aged 12 months were exposed to room temperatures of 10°–20°C. Sweat cups, for estimating the amount of evaporative water loss through the skin, were placed over thoracic, midflank and sacral regions of each calf. The temperature of the hypothalamus was raised to 41°C. for 3 min. by means of a radio-frequency voltage applied between 2 electrodes 15 cm. apart on either side of the midline, dorsal to the optic chiasma. The rate of loss of moisture increased in 31 or 35 instances although the magnitude varied, coupled with a rise in respiratory rate and skin temperature in those instances where initial temperatures were low. The rate of loss of moisture increased rapidly while the hypothalamus was being heated and continued to rise after the heating ceased, followed by a slow decline.

—JOYCE E. HAMMANT.

Taneja, G. C. & Bhatnagar, D. S. (1960). **Thermo-regulatory mechanism in buffalo calves. I. Effect of shower and exercise on body temperature, pulse-rate and respiratory frequency.**—Indian J. Dairy Sci. 13, 170-178. 4146

Five buffalo calves were exercised for half an hour at midday, while 5 had water poured over them and 4 controls were tied up in the sun. The authors determined the effects on body temperature, breathing rate and pulse rate, their interdependence, and their correlation with air temperature and relative humidity.—M.G.G.

Smith, I. D. (1961). **Thermoregulation in the newborn Merino.**—Aust. vet. J. 37, 205-210. [Author's summary modified.] 4147

Thermoregulatory behaviour in the Merino lamb during the first 24 hours of life in a semi-arid tropical environment is described.

The temperature of the lamb recorded immediately after birth was slightly in excess of the parturient maternal temperature. Rectal temperature fell immediately after

birth but usually it rose again within 20 min. At atmospheric temperatures of more than 80°–85°F., this fall tended to disappear.

At two different times of the year at atmospheric temperatures of 75° to 85°F., similar rectal temperatures were recorded. Lambs exposed to high atmospheric temperatures were incapable of prolonged physical exertion, and this may be an important predisposing cause of lamb mortality.

Weiss, B. & Laties, V. G. (1961). **Behaviour thermoregulation.** — *Science* **133**, 1338–1344. 4148

Rats with fur removed by clipping were each put for sessions in a chamber placed in a room at 2°C. Within the chamber was a lever, pressure on which by the rat switched on, for a few seconds, an infra-red heat lamp. At some point during a session the rats suddenly began to press the lever at a steady rate, and thus maintained body temperature. Clipped rats which had been kept at 2°C. for 5 hours immediately before being put in the chamber waited 2 hours before starting to press for heat, whereas rats kept at room temperature for that 5 hours waited 5 hours. Thyroid-ectomized rats started to press for heat earlier than intact rats. Rats acclimatized to cold by keeping them at 2°C. for about 1 month delayed pressing for heat for a longer period than did non-acclimatized rats kept at 25°C. The subcutaneous temperature of rats was recorded. It was found that by pressing for heat they were able to maintain a fairly constant peripheral temperature. Rats given several sessions in the chamber started to press for heat earlier in the later sessions than in the first.

The effect of heat on the body being practically instantaneous is a factor which enables the animal to maintain body temperature by behavioural means.—A. BROWNLEE.

Wilson, W. O., Abbott, U. K. & Abplanalp, H. (1961). **Evaluation of Coturnix (Japanese quail) as pilot animal for poultry.** — *Poult. Sci.* **40**, 651–657. [Authors' summary modified.] 4149

Observations on physiology, development and morphology of the Japanese quail (*Coturnix coturnix japonica*) suggest its use as a pilot animal in poultry research.

The rate of embryonic development, as well as the growth of young quail, is more rapid than for the fowl. Embryonic mortality was most pronounced in the first three, and again in the last two days of incubation.

Strong adverse effects on hatchability resulted from both increased egg storage time and aging of the hens.

Some individual hens laid over 300 eggs in their first year of production. Under good environmental conditions quail populations may produce double the egg mass per unit of body weight of good laying strains of fowls. Quail reach sexual maturity as early as 5 to 6 weeks of age; mature body size is attained at about 8 weeks in males and 9 to 10 weeks in females.

Naaktgeboren, C. & Zwillenberg, H. H. L. (1961). Untersuchungen über die Auswüchse am Amnion und an der Nabelschnur bei Walen und Huftieren, mit besonderer Berücksichtigung des europäischen Hausrindes. [**Proliferations on the amnion and umbilical cord of whales and ungulates, with special reference to the cow.**]—*Acta morph. neerl.-scand.* **4**, 31–60. [In German.] 4150

The proliferations, which occur only in whales and ungulates, were classified into eight different types. In the cow they appeared when the embryo measured 7.5 cm. and they consisted of ectodermal epithelium; similar structures occurred in ewe and deer. There are 33 photographs and a colour plate. —R.M.

McCosker, P. J. (1961). **Paraphenylenediamine oxidase activity and copper-levels in mammalian plasmas.** — *Nature, Lond.* **190**, 887–889. 4151

Total copper content of the plasma of several species of mammals was determined. M. attempted to correlate the *p*-phenylenediamine oxidase activity in the plasma to the indirectly-reacting fraction of the plasma copper. When the oxidase activity was expressed as activity/μg. indirectly-reacting Cu, the species differences were marked, in decreasing order of pig, man, cattle, dog, sheep, cat. The reason for these differences was discussed and it was concluded that of the 8 atoms Cu bound in the molecule of caeruloplasmin, all 8 were catalytically active in that derived from pig, only 4 in that from man and 2 in the molecule from the other species.—JOYCE E. HAMMANT.

Charnot, Y. (1960). Répercussion de la déshydratation sur la biochimie et l'endocrinologie du dromadaire. [**Effects of dehydration on the biochemistry and endocrinology of camels.**]—*Trav. Inst. sci. chérif., Sér. Zool.* No. 20 pp. 167. 4152

C. studied 17 camels at Rabat, Morocco. Determinations were made of water content and chemical composition of blood, urine and tissues, and iodine content of the thyroid gland before and after water deprivation. Adrenal function was assessed by chemical composition of the cortex and by urinary excretion of 17-ketosteroids. The results are presented and discussed in detail.—R.M.

Bachrach, D., Szabó, E. B., Baradnay, G. & Korpássy, B. (1961). **Histophysiological changes of the adrenal cortex of the rat in dehydration and rehydration.**—*J. Endocrin.* **23**, 1-8. 4153

The authors concluded that dehydration following thirsting seems to be a particular type of stress, which exerts a stimulating effect on both external layers of the adrenal cortex alike.—R.M.

Rubini, M. E., Montalvo, G., Lockhart, C. P. & Johnson, C. R. (1961). **Metabolism of zinc-65.**—*Amer. J. Physiol.* **200**, 1345-1348. [Authors' abst. modified.] 4154

Absorption, deposition, and excretion of zinc⁶⁵ was studied in mice, rats and dogs. When fed to animals it was poorly absorbed, but its long half-life made even the small portion absorbed physiologically significant. Absorption was obviated by feeding large quantities of non-radioactive carrier zinc. Injected zinc⁶⁵ chloride was first deposited, preferably in the pancreas, liver, and spleen, with only minor deposition in muscle and in the brain. Subsequently, a large proportion was transferred to bone. Excretion was mainly in faeces, presumably by pancreatic secretion. Injected non-radioactive zinc or treatment with 2, 3-dimercaptopropanol (BAL), Versene, or cadmium ion failed to alter body burden significantly. Cadmium decreased soft tissue zinc⁶⁵ deposition and increased accretion by the skeleton.

Simkiss, K. (1961). **Calcium metabolism and avian reproduction.**—*Biol. Rev.* **36**, 321-367. [Author's summary modified.] 4155

A large number of factors influence the requirements of birds for calcium, but, at the time of reproduction, they retain increasing amounts of the element from their food. This phenomenon is under the control of the sex hormones.

Injection of oestrogens increases the level of Ca and P in the blood. This increase occurs mainly in the non-diffusible fraction of the blood calcium, and a similar increase occurs

during reproduction in the female members of some fish, amphibia and reptiles. Blood Ca of the male is not affected by reproductive activity.

The various theories which have been proposed to explain the increase in non-diffusible calcium are briefly discussed. The theory relating these changes to the transport of yolk proteins is regarded as the most satisfactory one for normal conditions. The role of the parathyroid glands and the level of diffusible calcium are also considered.

Evidence is presented that much calcium is stored during reproduction in a special system of the bone marrow cavities. This medullary bone is formed under the influence of oestrogens and androgens, and provides a very labile source of calcium which is mobilized during the formation of the egg-shell.

The structure of the avian eggshell is briefly described and its formation is related to changes which occur in Ca metabolism. Various theories are discussed to account for the calcification of the eggshell.

When the egg is incubated, the developing embryo is responsible for loosening the shell membranes from the rest of the eggshell. The chick which hatches from an egg contains about five times as much Ca as did the original egg contents. Thus the chick has obtained about 80% of its skeletal calcium from the calcium in the eggshell. S. discussed theories proposed to account for the transference of calcium from the eggshell to the developing bird.

Schaefer, K. E., Hasson, M. & Niemoeller, H. (1961). **Effect of prolonged exposure to 15% CO₂ on calcium and phosphorus metabolism.**—*Proc. Soc. exp. Biol., N.Y.* **107**, 355-359. [Authors' summary modified.] 4156

During chronic respiratory acidosis, produced by prolonged exposure of g.pigs to 15% CO₂, plasma calcium increased and plasma phosphorus decreased. These changes appear to be related to increased parathyroid activity as evidenced by increased urinary phosphorus excretion. Ultrafiltrable calcium increased only slightly during uncompensated respiratory acidosis, and rose much higher during the period of compensation, when plasma inorganic phosphorus was much lower. Renal calcification occurred in g.pigs exposed for prolonged periods to 15% CO₂.

Brochart, M., Larvor, P. & Vissac, B. (1960). **Influence de quelques facteurs alimentaires,**

saisonniers et endocriniens sur le métabolisme de Ca, P, K, Na chez 2 couples de jumelles bovines univitellines. [**Effect of nutritional, seasonal and endocrine factors on the metabolism of Ca, P, K, and Na in two pairs of identical twin cows.**]—Ann. Zootech. 9, 5-68. [Summary in English.] 4157

Samples of blood, urine and faeces were analysed weekly for a year, and of hair every second month. The cows were housed throughout the year. The results were examined for influence of season and feeding; relationships between Ca, P, K and Na in blood, urine and faeces; interrelationships between the different elements; and fluctuations in the mineral content of hair. Further details are given in the English summary and in the eleven tables. There was a positive relationship between the plane of metabolism and total serum phosphorus, inorganic P in serum and P in urine. Variations in mineral content of hair caused by season were generally smaller than variations between each cow.—R.M.

Cowie, A. T. & Tindal, J. S. (1961). **The maintenance of lactation in the goat after hypophysectomy.**—J. Endocrin. 23, 79-96. [Authors' summary modified.] 4158

Five adult goats were hypophysectomized during lactation; within 10 days their milk yields dropped to a fifth or less of the pre-operative levels. Daily milk yield was increased by giving daily injections of anterior-pituitary extract from cattle or sheep.

Prolactin and somatotrophin appear to be major components of the lactogenic and galactopoietic complexes in the goat, but further study is required. A marked increase in water intake of one goat appeared to be associated with administration of somatotrophin. The possibility of species specificities existing in relation to prolactin are discussed.

Buschmann, H. & Schmid, D. O. (1961). **Transferrin-groups of foetal calf-serum.**—Nature, Lond. 190, 1209-1210. 4159

Blood group factors in embryos of cattle are genetically dependent and fixed in the mother cells of the erythropoietic system; with immune sera the factors can be identified in the early embryonic stage by the immuno-haemolytic and inhibition tests. A study of foetal sera was made with starch-gel electrophoresis; by separation of the beta-globulins all transferrin groups so far observed in the serum of adult cattle of highland breeds

(Fleckvieh, Brown Swiss) were demonstrable. [See also *V.B.* 31, 3761.]—E.V.L.

Sturkie, P. D. & Textor, K. (1961). **Relationship of blood pressure level in chickens to resistance to physical stresses.**—Amer. J. Physiol. 200, 1155-1156. [Authors' abst. modified.] 4160

Hypertensive and hypotensive White Leghorns were subjected to low and high temperatures and to exercise. There were no significant differences in the response of hypertensive and hypotensive birds to high temperature. When hypothermia was induced by placing the birds in water at 20°C., survival times of the hypertensive males and females were significantly greater than for the hypotensive birds. When hypertensive and hypotensive birds were made to exercise (treadmill walking) the resistance to fatigue was significantly greater in the females with high blood pressure, but no differences were observed between the two groups of males; both hypertensive and hypotensive male birds exhibited considerably greater resistance to fatigue than did the females.

Ring, G. C., Blum, A. S., Kurbatov, T., Moss, W. G. & Smith, W. (1961). **Size of microspheres passing through pulmonary circuit in the dog.**—Amer. J. Physiol. 200, 1191-1196. [Authors' abst. modified.] 4161

After injection of microspheres into the pulmonary artery about half of spheres 2.8-4.0 μ in diameter were found in the systemic circuit during the first circulation, but only 6% of those 8 μ or larger got through the pulmonary circuit when compared with simultaneously injected tagged erythrocytes. If vessels are impeding the flow of spheres and are circular in cross section, then more than half of the erythrocytes must be distorted while passing through the pulmonary circuit. A continuous infusion of norepinephrine (1-4 μ g./kg./min.) brings about a reduction in the percentage of the various sizes of spheres passing through the pulmonary vessels. This suggests vasoconstriction. Acetylcholine iodide (13-40 μ g./kg./min.) usually diminishes the percentage of spheres 2.8 μ and smaller, which can go through the pulmonary circuit, but increases the percentage of microspheres 5.7 μ and larger. During prolonged inspiration the percentage of microspheres passing through in each group studied was less than during expiration. If all microspheres injected are to pass through the

pulmonary circuit in inspiration they must be 1.4μ or smaller.

Nicol, T., McKelvie, P. & Druce, C. G. (1961). **Phagocytic activity of the reticulo-endothelial system.**—*Nature, Lond.* 190, 418-419. 4162

Twenty male mice weighing 20–25 g. received one i/v injection of 0.05 ml. of an 8 day culture of B.C.G. on Dubos medium. At weekly intervals the phagocytic activity was measured in 5 animals by estimating the rate of disappearance of a known amount of carbon particles. R.b.c. counts and the weights of the liver and spleen were also determined. Ten mice served as controls. Phagocytic activity increased, reaching a peak after 3 weeks. Thereafter it declined, accompanied by a corresponding enlargement of the liver and spleen. The r.b.c. counts were slightly reduced. It was concluded that the reticulo-endothelial phagocytes can be stimulated by non-oestrogenic substances.

—JOYCE E. HAMMANT.

Shevtsova, N. I. (1961). [**Stimulation of the rumen by intravenous injection of sodium chloride or sodium sulphate.**]—*Veterinariya, Moscow No. 7* pp. 59-60. [In Russian.] 4163

Contractions of the rumen became three to five times more frequent 30 min. after i/v inj. of 200 ml. of 10–20% sodium chloride or sodium sulphate soln. into cows. The effect lasted for three hours. Calcium chloride did not have this action, but caused dyspnoea and cardiac arrhythmia.—R.M.

Phillips, G. D. (1961). **Physiological comparisons of European and zebu steers. I. Digestibility and retention times of food and rate of fermentation of rumen contents. II. Effects of restricted water intake.**—*Res. vet. Sci.* 2, 202-208 & 209-216. [Author's summaries modified.] 4164

I. Zebu steers digested about 3% more of the organic matter of low quality grass hay than did grade Hereford steers, and the rate of fermentation of the rumen contents was also higher, perhaps on account of their greater saliva production.

II. Restricting the water intake increased significantly the digestibility of the organic matter of the diet in Hereford steers, but the increase in zebu steers was small. Changes in the freezing point of rumen contents were possibly due to increased production of saliva when water was restricted, which in turn may

have favoured fermentation and consequently digestibility.

The freezing points of the contents of the large intestines indicated differences, between the Hereford and zebu steers, in the absorption of water and osmotically active substances from the terminal gut. Restricting the water intake increased the absorption of water from the large intestine of both types of steer, but changed the freezing point of the contents only in the Herefords.

Kimberg, D. V., Schachter, D. & Schenker, H. (1961). **Active transport of calcium by intestine: effects of dietary calcium.**—*Amer. J. Physiol.* 200, 1256-1262. [Authors' abstr. modified.] 4165

Almost the entire small intestine of young rats fed a diet low in Ca can transfer calcium from the mucosa to the serosa against concentration gradients. The active transport is maximal in duodenum, less in ileum, and least in the middle of the small intestine. Following the low-Ca diet, duodenal gut sacs transport Sr^{89} against concentration gradients, although strontium is transferred much less readily than is calcium. Vitamin D is required for the adaptive response of the active transport in duodenum and ileum. Younger rats respond to Ca deprivation earlier and more markedly than older animals. Removal of thyroid, parathyroid, pituitary or adrenal glands did not prevent response to the low-Ca diet, although these ablations did affect the active transport mechanism in rats on a given diet.

Storry, J. E. (1961). **Calcium and magnesium contents of various secretions entering the digestive tract of sheep.**—*Nature, Lond.* 190, 1197-1198. 4166

Ca and Mg were estimated in solutions of the ashed secretions of saliva, gastric juice, bile, pancreatic juice, Brunners' glands and caecum. The total amounts entering the digestive tract from the sources investigated averaged 27.18 m. equiv. of Ca and 16.12 m. equiv. Mg. It was suggested that proportionately similar amounts of these elements entered the bovine digestive tract.

—JOYCE E. HAMMANT.

Storry, J. E. (1961). **Studies on calcium and magnesium in the alimentary tract of sheep. I. The distribution of calcium and magnesium in the contents taken from various parts of the alimentary tract. II. The effect of reducing the acidity of abomasal digesta in vitro on the distribution of calcium and magnesium.**

— J. agric. Sci. 57, 97-102 & 103-109.
[Author's summaries modified.] 4167

The distribution of Ca and Mg in the contents of the reticulo-rumen sac, omasum, abomasum, small intestine, caecum and colon of the sheep was studied by means of ultrafiltration through collodion membranes. The concentrations of ultrafiltrable Ca and Mg in rumen fluid were insufficient for these elements to be absorbed as freely diffusing ions, whereas in the abomasum and duodenum the concentrations of ultrafiltrable Ca and Mg were in favour of a net uptake from the gut.

Increasing the pH of abomasal contents of the sheep *in vitro* reduced the concentrations of ultrafiltrable Ca and Mg as a result of the binding of these ions to suspended material in the digesta. In the presence of this material such binding prevented the precipitation of calcium phosphate and magnesium ammonium phosphate which would otherwise have occurred about pH 6.0. Formation of calcium and magnesium soaps was not a factor contributing to the reduced concentrations of ultrafiltrable Ca and Mg. At saturation the binding capacity of the material was greater for Ca than Mg. Although some of the binding sites were common to both ions calcium was more strongly bound. The bound and ultrafiltrable forms of both elements were in equilibrium.

Campbell, R. M., Cuthbertson, D. P., Mackie, W., McFarlane, A. S., Phillipson, A. T. & Sudsaneh, S. (1961). **Passage of plasma albumin into the intestine of the sheep.**—J. Physiol. 158, 113-131. [Authors' summary modified.] 4168

Intravenously administered ^{131}I -plasma albumin was catabolized very slowly by the sheep. Sodium iodide at a concentration of 0.01% in the drinking water was toxic: no untoward effect resulted from a concentration of 0.0025%. Following catabolism of the labelled protein increasing proportions of the excreted radioactivity appeared in the faeces.

Protein-bound radioactivity was present in digesta obtained from cannulae in the duodenum and jejunum along with much larger amounts of radio-iodide.

Sheep cannot use intravenously injected radio-iodide to produce protein-bound radioactivity in the digesta or faeces.

Fluids from isolated loops of jejunum of sheep which had received ^{131}I -serum albumin intravenously contained substantial amounts of protein identified as plasma albumin on the

bases of electrophoretic behaviour and specific radioactivity.

The authors discussed the site of normal catabolism of plasma albumin and the possible role which passage of albumin into the small intestine may play in supplementing the quota of endogenous protein.

Ferrando, R., Froget, J. & Heude, B. (1961). Etude du transit alimentaire chez le poulet par la méthode radiographique. [**Radio-graphical study of alimentary transport in the fowl.**]—Rec. Méd. vét. 137, 357-365. [Summaries in English and Spanish.] 4169

In chicks up to 12 weeks old, faecal elimination of a dose of barium sulphate began 2-3 hours after oral administration, compared with 4½-5 hours in laying hens. Its passage through the digestive tract was followed. It appears that ingesta pass quickly through the proventriculus and only a small proportion enters the caeca. There are 6 radiographs.—M.G.G.

Magee, D. F. (1961). **An investigation into the external secretion of the pancreas in sheep.**—J. Physiol. 158, 132-143. [Author's summary modified.] 4170

Thomas-type pancreatic fistulae were constructed in seven sheep. Normal sheep secreted 3.1 ml./15 min. of pancreatic juice containing amylase activity equivalent to 100 mg. of maltose. Both fasting (48 hr) and the absence of abomasal contents in the duodenum halved secretion and amylase.

The pH of the duodenal chyme was believed to be an important regulator of pancreatic activity.

Balloon distension of the abomasum was without effect on secretory volume or amylase.

Crosfill, M. L. & Widdicombe, J. G. (1961). **Physical characteristics of the chest and lungs and the work of breathing in different mammalian species.**—J. Physiol. 158, 1-14. [Authors' summary modified.] 4171

Pulmonary compliance, resistance and chest-wall compliance have been measured in four individuals of mouse, rat, guinea-pig, rabbit, monkey, cat and dog.

There was little interspecific difference in pulmonary compliance except that rabbit lungs were more compliant, and human lungs less, than the other species. Lung resistance (per unit lung volume) tended to increase with the size of the animal.

Mice, rats, g.pigs and rabbits had very high chest-wall compliances and low

functional residual capacities compared with animals in the other four species. The frequencies of breathing mechanically most economical (optimal rates) were calculated for the individuals, and corresponded quite closely to the observed rates of breathing.

Frequency of breathing could vary considerably for constant alveolar ventilation, with little increase in work; this was especially true for the smaller animals.

Dellmann, H.-D. (1961). Histologische Untersuchungen über den Feinbau der Zona interna des Infundibulum beim Rind. [**Fine structure of the internal zone of the infundibulum in cattle.**]—Acta morph. neerl.-scand. 4, 1-30. [In German.] 4172

A histological study, with 8 photomicrographs.—R.M.

Crabo, B. (1961). **On the glycogen contents in the renal epithelium of some domestic and laboratory animals.**—Acta morph. neerl.-scand. 4, 71-78. [In English. Author's summary modified.] 4173

Glycogen was demonstrated histochemically in the collecting tubules of ox, sheep, pig, dog, rabbit, g.pig, rat and mouse, but was not present in cat. Glycogen was absent from glomeruli and the renal capsule. The kidneys of ruminants contained most glycogen; it was present in very small amounts in pig, mouse and rat.

Nicander, L., Abdel-Raouf, M. & Crabo, B. (1961). **On the ultra structure of the seminiferous tubules in bull calves.**—Acta morph. neerl.-scand. 4, 127-135. [In English.] 4174

Attention was paid to gonocytes, indifferent cells, spermatogonia, Sertoli cells and the basement membrane. There are seven electron photomicrographs.—R.M.

Welch, R. M., Hanly, E. W. & Guest, W. (1961). **The deoxyribonucleic acid (DNA) deviation in the semen spermatozoa of bulls of unknown fertility under two years of age and its relationship to motility, count and morphology.**—J. Morph. 108, 145-163. 4175

DNA was determined in 658 semen samples from 275 Santa Gertrudis bulls. Semen having the poorest motility, count and morphology had the lowest concentrations of DNA. By estimating the DNA content it was possible to predict, within certain limitations, the fertility of a bull.—R.M.

Hay, M. F., Lindner, H. R. & Mann, T. (1961). **Morphology of bull testes and**

seminal vesicles in relation to testicular androgens.—Proc. roy. Soc. Ser. B. 154, 433-448. 4176

The growth and secretory activity of the seminal vesicles and the development and hormone activity of the testicles were directly related to the diameter of the seminiferous tubules.—R.M.

Kellas, L. M. (1961). **An intra-epithelial granular cell in the uterine epithelium of some ruminant species during the pregnancy cycle.**—Acta anat. 44, 109-130. [In English. Summaries in French and German.] 4177

Intra-epithelial granular cells were observed in large numbers in the intercotyledonary regions of the placenta in eight ruminant species. Their numbers increased as pregnancy proceeded. The role of the cells is unknown.—R.M.

van Lennep, E. W. (1961). **Histology of the placenta of the one-humped camel (*Camelus dromedarius* L.) during the first half of pregnancy.**—Acta morph. neerl.-scand. 4, 180-193. [In English.] 4178

Material was collected from eight camels slaughtered in Central Sudan. There are 15 photomicrographs. The author concluded that on a morphological basis the camel's placenta was intermediate between those of *Suiformes* and *Ruminantia*.—R.M.

Levy, G. A., McAllan, A. & Hay, A. J. (1961). **Glycosidases in the corpus luteum.**—J. Endocrin. 23, 19-24. [Authors' summary modified.] 4179

The corpus luteum in cow, sow and woman is rich in six glycosidases. The activity of these enzymes in the follicular fluid and in the remainder of the ovarian tissue is usually negligible. The activities found in the corpora lutea of pregnant and non-pregnant animals were the same.

Sato, M., Shimizu, H. & Takeuchi, S. (1960). **On the thyroid gland activity of ruminant. I. The seasonal changes of serum protein-bound iodine in the dairy cattle.**—Tohoku J. agric. Res. 11, 329-339. [In English.] 4180

Monthly estimations of bound iodine in serum of 5 Holstein and 5 Jersey cows in various stages of pregnancy and lactation revealed no variations, except that values were higher in summer than in winter.

—JOYCE E. HAMMANT.

Hoersch, T. M., Reineke, E. P. & Henneman, H. A. (1961). **Effect of artificial light and**

ambient temperature on the thyroid secretion rate and other metabolic measures in sheep.

—J. Anim. Sci. 20, 358-362. 4181

Thyroid secretion rates were measured on 64 ewe lambs aged 12 months, maintained on a standard diet under controlled temperatures either 50° or 90°F., with varying amounts of artificial light: 4, 8, 12, 16, 20, 24 hours. The thyroxine substitution technique was employed for all secretion rate determinations and each trial lasted 30 days. The thyroid secretion rate of the animals maintained at 50°F. was three times that of the 90°F. group. Under both temperature conditions, increasing the amount of light produced a diphasic effect, with thyroid activity decreasing from 4-12 hrs. and thence progressively increasing. Ewes maintained at 50°F. gained weight faster and were more efficient at food conversion although the food consumption was similar in both temperature groups. Thyroid secretion rate was positively correlated with body weight gains and feed efficiency.

—JOYCE E. HAMMANT.

Copp, D. H. & Davidson, A. G. F. (1961).

Direct humoral control of parathyroid function in the dog.—Proc. Soc. exp. Biol., N.Y. 107, 342-344. [Authors' summary modified.] 4182

Control of parathyroid function was

See also absts. 4216 (book, animal vision); 4217 (book, comparative osteology).

studied in dogs in which the isolated thyroid-parathyroid glands were perfused with blood having a high or a low calcium content. Blood low in calcium appears to release parathyroid hormone. The resulting rise in systemic blood calcium does not depend on a fall in the inorganic phosphate of blood.

Westpfahl, U. (1961). Das Arteriensystem des Haushuhnes (*Gallus domesticus*). [**Arterial system of the fowl.**] — Wiss. Z. Humboldt- Univ. 10, 93-124. 4183

A detailed account based on dissection of 42 fowls, and a comparison with previously published work.—R.M.

Arvy, L. (1961). I. Données histoenzymologiques sur la glande surrénale d'*Ovis aries* L. (*Ovinæ*, Baird, 1857) var. des Causses du Lot. II. Contribution à l'histochemie de la glande surrénale chez *Gallus domesticus* L. et chez *Anas boschas* L. [**Histochemistry of the adrenal gland in sheep, fowl and duck.**] — C. R. Soc. Biol., Paris 155, 25-27 & 69-71. 4184

Histological sections of glands were examined for dehydrogenase, cholinesterase and phosphatases and by the potassium iodate reaction. Special attention was paid to cortical and chromaffin tissues.—R.M.

LIVESTOCK HYGIENE

Nelson, G. L., Mahoney, G. W. A. & Berousek, E. R. (1961). **Hot weather shelter for lactating dairy cattle.**—Tech. Bull. Okla. agric. Exp. Sta. No. T-87 pp. 47. [Authors' summary modified.] 4185

Two shelters were tried as a means of improving comfort for cows during hot summer weather. One was a completely enclosed and insulated masonry shelter equipped with an evaporative cooler and ventilating fans, the other a typical open-front shelter.

Experiments were conducted during four summers. Data were collected on temperature, humidity, and air motion in the shelters. No large differences among groups were observed which could be attributed to the type of shelter or environment provided. Differences in milk production among groups were not statistically significant.

The cows in the air-cooled barn and the open shelter appeared to be much more com-

fortable than the cows without shelter. Observations indicated that cows preferred shade outside rather than inside the shelters.

Muehling, A. J. & Jensen, A. H. (1961). **Environmental studies with early-weaned pigs.**—Bull. Ill. agric. Exp. Sta. No. 670 pp. 39. [Authors' summary modified.] 4186

272 pigs were weaned at 2 to 2½ weeks of age. None of the supplementary heating units (heat lamp, heat pad, heated and unheated hovers) significantly affected growth rate of pigs confined for 2 or 3 weeks in a chamber having constant temperatures as low as 38°F., but pigs without supplementary heat required more feed per lb. of gain.

In one test in which temperatures varied from 25° to 66° F. and forced draughts were employed, pigs having access to heated hovers grew 6% faster on 25% less feed than unprotected pigs.

Although body temperature was not

affected much by environment, skin temperatures were very different when heat lamps provided supplementary heat. The piglets adapted themselves to constant temperatures as low as 38°F. when kept free from draughts

and dampness. The optimum surface temperature of heat pads on the floor, as determined by apparent comfort of the pigs, was about 110°F.

REPRODUCTION AND REPRODUCTIVE DISORDERS

White, I. G. & Wales, R. G. (1960). **The susceptibility of spermatozoa to cold shock.** — *Int. J. Fertil.* 5, 195-201. [Abst. from authors' summary.] 4187

Although ram and bull spermatozoa are severely affected by rapid cooling, the authors concluded that cold shock was not as widespread a phenomenon as the literature implied. Dehydration of the lipid capsule might render spermatozoa more susceptible to cold shock. Resistance to cold shock was a property of the cell and it was little affected by the accessory secretions.

Blom, E. & Birch-Andersen, A. (1961). **An 'apical body' in the galea capitis of the normal bull sperm.** — *Nature, Lond.* 190, 1127-1128. 4188

Studying the ultrastructure of bull spermatozoa, fixed within 30 min. of collection in 1% osmium tetroxide, the authors detected a characteristic thickening along the front edge of the head of the galea capitis, completely enveloped in the cell membrane, which they named "apical body". It contained a narrow cylindrical structure or vacuole. Its presence was confirmed in sagittal sections of the head of 12 normal spermatozoa from 3 different bulls, but also in the galea capitis of rabbit spermatozoa.—E.G.

Burger, R. E., Shoffner, R. N. & Roberts, C. W. (1961). **Treatment of fowl sperm and developing embryos with deoxyribonucleic acid extracts.**—*Poult. Sci.* 40, 559-564. 4189

Four crude sources and 4 purified preparations of DNA from fowls and geese were used for treating fowl semen and for injecting into chick embryos. No traits of the donors of the DNA were observed in the chickens or late embryos or their progeny.

—M.G.G.

Hancock, J. L. & Hovell, G. J. R. (1961). **The effect of semen volume and number of spermatozoa on the fertility of intra-uterine inseminations of pigs.**—*Anim. Prod.* 3, 153-161. 4190

Sows were inseminated into the uterus, either with 20 ml. of a mixture of semen with

egg-yolk, glucose and phosphate, or by a similar dose of diluted semen, followed by 100 ml. of the diluent alone. Three concentrations of spermatozoa were tested. Fertility was estimated from the percentages of cleaved or fertilized ova recovered P.M., 2-4 days after insemination, or from the number of foetuses counted 25 days after insemination. Percentages of cleaved ova were considerably higher in sows given 20 ml. of diluted semen alone, and the number of spermatozoa on ova was lower in those inseminated with 120 ml. The average number of foetuses per sow was 11.6 in those inseminated with 20 ml. of diluted semen, containing 10.0×10^9 spermatozoa, and 7.1 in those inseminated with a conc. of 1.0×10^9 .—E.G.

Dun, R. B. & Restall, B. J. (1961). **Artificial insemination of Australian sheep.**—*Aust. vet. J.* 37, 145-149. 4191

The management and techniques which have proved, or are likely to be, successful in artificial insemination of sheep in Australia are reviewed. The possible uses of artificial insemination are summarized as are the reasons for the conservative attitude of stud breeders. It is concluded that at present artificial insemination has a place in the industry only as a special purpose technique.

—A. A. DUNLOP.

Watson, R. H. (1961). **The influence of pre-joining with vasectomized rams on the course of mating in the late spring and early summer.**—*Aust. vet. J.* 37, 217-221. [Abst. from author's summary.] 4192

Joining vasectomized rams with ewes two weeks before fertile rams were introduced had no advantages over the use of fertile rams at a similar time, unless mating in some ewes was delayed. But even then, fertile rams may be equally useful if the ewes which mate early are identified. Lambing may even be advanced by this procedure.

Lishman, A. W. & Hunter, G. L. (1961). **Synchronisation of the oestrous cycle in sheep. 2. Administration of progesterone daily or at three-day intervals.**—*S. Afr. J. agric. Sci.* 4,

35-50. [In English. Summaries in French and Afrikaans.] 4193

Sixty ewes were divided such that half received 7 i/m injections each of 30 mg. progesterone at 3 day intervals and the remainder 21 injections, 10 mg./day. P.M.S. (500 i.u.) was administered s/c following another injection interval after the last dose of progesterone, to half the animals in each group. The onset of oestrus was observed and the animals allowed to mate. The degree of synchronization of oestrus was similar in the two groups, although a higher percentage of suboestrous cycles occurred when 30 mg. was administered every 3rd day. P.M.S. did spread the onset of oestrus when given after daily progesterone, but had no effect on the mean time of commencement. The fertility of the ewes was considered to be low.

—JOYCE E. HAMMANT.

Ch'ang, T. S. (1961). **Reproductive performance of New Zealand Romney sheep grazed on red clover (*Trifolium pratense*) pastures.** —J. agric. Sci. 57, 123-127. [Abst. from author's summary.] 4194

Ingestion of oestrogenic red clovers caused the ewe lambs to accept the male before the start of the normal breeding season. No corpus luteum was found in the ovary of these lambs. The subsequent reproductive performance of these ewe lambs at 2 years of age was not affected. Red clover did not affect the reproductive performance of the young ewes at 2 years of age, but did cause a protracted lambing season and a reduced level of lambing performance in the aged ewes at 6 years of age.

Nicol, T., Bilbey, D. L. J. & Druce, C. G. (1961). **Effect of tri-p-anisylchloroethylene, dienioestrol and stilboestrol diphosphate.** —Nature, Lond. 190, 419-420. 4195

Fifty male mice, weighing 20-25 g. were used in groups of 5 for testing the compounds: tri-p-anisylchloroethylene administered s/c for 6 days in 0.5 mg. doses and orally in 1 mg. dosage for 6 and 12 days respectively; dienioestrol and stilboestrol each s/c in doses of 0.5 mg. daily for 6 days. The phagocytic activity of the r.e.s. was measured 2 days after the completion of the injections, together with determinations of r.b.c. counts and spleen and liver weights. All the substances were active stimulants of phagocytic activity, but that of tri-p-anisylchloroethylene was unaccompanied by hepatic

enlargement. This may be because this pro-oestrogen is stored in the body fat and released gradually to be converted by the liver into a potent oestrogen and hence probably has greater clinical potentialities than the other synthetic oestrogens.

—JOYCE E. HAMMANT.

Beard, D. C. (1961). **Hydroxyprogesterone acetate: use in estrogenic and progesterogenic states in the bitch.**—Small Animal Clinician 1, 215-218. 4196

Daily oral doses of 1.8 mg./lb. body wt. of hydroxyprogesterone acetate, given to anoestrous bitches, prevented oestrus whilst treatment lasted. Normal cycles started again 2 weeks to 8 months after discontinuance of treatment. Daily doses of 3-6 mg./lb. terminated prolonged oestrus. The value of this drug for treating pseudopregnancy was discussed.—E.G.

Månsson, J. & Norberg, I. (1961). **Höftleds-dysplasi hos hund. Hormonellt framkallad avslappning av höftledens bandapparat hos valpar, åtföljd av en dysplasi av acetabulum. [Dysplasia of the hip in dogs. Hormonally induced flaccidity of the ligaments followed by dysplasia of the acetabulum, in puppies.]** —Medlemsbl. Sverig. VetFörb. 13, 330-332 & 335-339. [In Swedish.] 4197

After discussing the literature on this condition in dog and man (18 references), the authors presented results of preliminary experiments with two litters of puppies from normal parents. Hip dysplasia was produced experimentally in 4 of 5 puppies treated every third day from 2 days of age with either relaxin (6 mg.) or oestrogen (0.3 mg.) or both. Clinical examination, confirmed by X-rays, revealed an increased flaccidity of the ligaments of the hip joints after 2-4 weeks' treatment, and by 3 months of age pronounced dysplasia of the acetabulum. These findings are considered to give strong support to a theory propounded in human medicine that the disease is primarily caused by a hormonally conditioned flaccidity of the ligaments.—F.E.W.

Knudsen, O. (1961). **Sticky chromosomes as a cause of testicular hypoplasia in bulls.** —Acta vet. scand. 2, 1-14. [In English. Summaries in German and Swedish.] 4198

Lagerlöf (1948) described a hereditary testicular hypoplasia in Friesians showing normal development up to spermatids but oligospermia. Knudsen (1958) attributed this

to "sticky" chromosomes. Five inbred Friesian bulls and 1 Red and White Swedish were sent in as totally infertile. Ten or more ejaculates were studied from each and also testicular tissue. Stained centrifuged ejaculate sediment was characteristically dominated by pyknotic nuclei. These were also evenly distributed, as shown in section, throughout the seminiferous epithelium of each affected testicle. Squash preparations of testicle showed sticky chromosomes forming bivalents in the primary spermatocytes, interfering overwhelmingly to render the subsequent course of cell division chaotic. Slight testicular hypoplasia was apparent clinically in these bulls.—F. L. M. DAWSON.

Knudsen, O. (1960). **Testicular biopsy in the bull.**—*Int. J. Fertil.* 5, 203-208. 4199

K. discussed the applicability of various methods under practical conditions. Excision with electrocoagulation for haemostasis was suitable only for special cases. Aspiration biopsy using very fine needles (0.6-0.8 mm. external diam.) yielded material suitable for cytological diagnosis, but unsuitable for histology.—R.M.

Dawson, F. L. M. (1961). **Corpus luteum enucleation in the cow: therapeutic and traumatic effects.**—*Vet. Rec.* 73, 661-669 & 670. [Author's summary modified.] 4200

Enucleation was carried out in a series of 8 normal control cows and 44 cows discarded for failure to breed (including 24 in which the uterus appeared normal and 20 with endometritis, as differentiated by histopathology). Enucleation was done twice in 7 cows and once in 45. Ovulation was induced by 75% of the enucleations. Oestrus signs accompanied about half of these where the previous natural ovulation had been suboestrus, thus confirming previous work. The findings of Schütte were confirmed that only 33% of ovulations induced in endometritis cases were accompanied by well-expressed oestrus, as contrasted with 66 to 77% in cases with normal uterus. Enucleation as late as the 12th to 14th day after the previous ovulation was just as efficient as earlier enucleation in bringing about ovulation, so also was the partial enucleation of a crumbling corpus, but not mere crushing. Out of the total of 59 enucleations, the existing ovarian cycle remained unaffected by 7; in 4 to 6 cows enucleation was followed by cyclic stasis, lasting from a minimum figure of 6 days up

to not less than 5 weeks. A further 4 enucleations precipitated cystic ovarian disease in the cows, and in one animal this resisted treatment. On this evidence cyclic stasis and cystic disease are the chief hazards attending corpus luteum enucleation. Bleeding was negligible when the previous ovulation had been silent, but relatively free when this had been accompanied by oestrus or when the uterus was occupied. In only 2 cases did enucleation result in the formation of bursal adhesions which might have interfered with fertility.

Ryle, M. (1961). **Early reproductive failure of ewes in a hot environment. I. Ovulation rate and embryonic mortality.**—*J. agric. Sci.* 57, 1-9. [Author's summary modified.] 4201

Twenty-four Merino ewes acclimatized to heat were compared with 24 kept at normal temperatures, with respect to ovulation rate and embryonic loss by 25 days' pregnancy. Possible modifying effects of thyroxine level, vitamin A intake and progesterone level were sought.

While the differences between the hot-room and yard groups as a whole were not significant, in the former there were fewer ovulations, a smaller proportion of the potential embryos actually began to develop and, of these, a larger proportion had died by 25 days' pregnancy. Consequently only 13 hot-room ewes contained live embryos compared to 20 in the yard; the total numbers of live embryos were 14 and 27, respectively.

In both groups the proportion of potential embryos developing and the proportion of actual embryos surviving at 25 days' pregnancy were greater when thyroxine injections were given. Thyroxine had no effect on ovulation rate, but it increased the proportion of hot-room ewes with live embryos.

Cole, R. K. (1961). **Paroxysm—a sex-linked lethal of the fowl. With a note on the xl lethal.**—*J. Hered.* 52, 47-52. 4202

A sex-linked recessive gene in fowls, causing paroxysm, stunted growth, stilted gait and eventually death in hemizygous females, was described. Hatching and early growth were apparently normal. Paroxysm was induced by noise, bright light, handling, sudden movement or any other unexpected auditory or visual stimulus, usually between 12-42 days of age.—E.G.

See also *absts.* 3886 (leptospiroal vaccine for control of bovine abortion); 4002 (aspermato-genesis induced by testicular antigen un-combined with adjuvant); 4005 (failure to reduce blowfly population by sterile male method); 4070 (effect of dietary fat levels upon reproductive performance in mink); 4174 (ultrastructure of the seminiferous tubules in bull calves); 4175 (deoxyribonucleic acid content and fertility of bull semen); 4176 (morphology of bull testes and seminal vesicles in relation to androgens); 4177 (epithelium of uterus during pregnancy in ruminants); 4178 (placental histology in the camel); 4179 (glycosidases in the corpus luteum); 4209 (report, U.K.); 4220 (book, breeding and management of mice); 4221 (book, animal husbandry in Asia and the Americas).

ZOOTECHNY

Britz, W. E., Jr., Fineg, J., Cook, J. E. & Miksch, E. D. (1961). **Restraint and treatment of young chimpanzees.**—*J. Amer. vet. med. Ass.* 138, 653-658. 4203

The authors describe the methods taken to restrain newly-imported young chimpanzees at the Aeromedical Field Laboratory, Holloman Air Force Base. Careful handling by at least two attendants suitably protected with gloves, the use of squeeze cages, and in some instances of anaesthetics and tranquillizers are recommended in handling strange animals. Usually after about 45 days forcible methods of restraint may be discontinued. A brief account is given of the main infectious conditions to be expected in these animals on arrival and advice is given on diagnosis, treatment and the best ways in which therapeutic agents may be administered to the animal.—R. N. FIENNES.

Wood, A. J., Nordan, H. C. & Cowan, I. McT. (1961). **The care and management of wild ungulates for experimental purposes.**—*J. Wildlife Mgmt* 25, 295-302. 4204

See also *absts.* 4220 (book, breeding and management of laboratory mice); 4221 (book, animal husbandry in Asia and the Americas).

TECHNIQUE AND APPARATUS

Shelley, W. B. & Florence, R. (1961). **Ethylene glycol monomethyl ether, a new fixative for histological work.**—*Nature, Lond.* 191, 719-720. 4206

Of 17 glycol ether fixatives studied, ethylene glycol monomethyl ether acetate was the best water-free coagulant fixative for mammalian tissue. Using standard paraffin embedding and staining techniques, it accentuated contrast, detail of cellular components and brightness of colour.—E.G.

Pullar, E. M. (1961). **Effect of delayed fixation on the measurement of bone ash.**—*Aust. vet. J.* 37, 169-172. [Author's summary modified.] 4207

There is a marked delay before desiccation and putrefaction produces an appreciable change in the measured bone ash content of unpreserved specimens. A spurious rise of up

The authors described housing, breeding and feeding of deer at the University of British Columbia, Canada.—R.M.

Mann, I. (1961). **Some problems of by-product manufacture in less developed countries.**—*Trop. Sci.* 3, 54-68. [Author's summary.] 4205

The paper aims to dispel a widespread misconception in tropical countries that full use of animal offal can be achieved only with costly equipment, and under conditions comparable to those in large meat-packing factories. This attitude leads to the paradoxical situation that nutritious raw materials such as blood and bones are wasted, while expensive blood meal and bone meal are imported. Even hides and skins are sold and re-imported as finished leather. The benefits to be derived from hygienically produced by-products in terms of less malnutrition among human beings, healthier livestock, better crops and the creation of new industries, are described. The structural requirements for a modern by-products plant are stated and illustrated by a plan.

to 7% in the ash content occurs between the 5th and 15th days in mid-summer, but did not occur in up to 15 days in mid-winter or in refrigerated specimens. A simplified procedure for the despatch of specimens for ash estimation is described.

Bowen, H. J. M. & Cawse, P. A. (1961). **Determination of sodium, potassium and phosphorus in biological material by radio-activation.**—*Analyst* 86, 506-512. [Authors' abst. modified.] 4208

Neutron-activation analysis has been applied to the determination of sodium, potassium and phosphorus in biological material. Ultimate limits of sensitivity for the three elements were approximately 10^{-10} , 10^{-9} and 10^{-10} g, respectively. Radiochemical separation procedures were used, and it was possible to analyse eight samples for all three elements in an 8-hour working day.

REPORTS

Great Britain. (1961). **Ministry of Agriculture, Fisheries and Food. Department of Agriculture for Scotland. Report on the Animal Health Services in Great Britain, 1959.** pp. 116. London: H.M. Stat. Off. 6s. 4209

As regards notifiable disease, the year was overshadowed by the worst epidemic of NEWCASTLE DISEASE ever known in this country. All told, 2,062 outbreaks entailed the slaughter of nearly five million birds and the destruction of close on one million hatching eggs. Compensation reached little less than £3½ million.

Regarding FOOT AND MOUTH DISEASE, the position was good, the number of outbreaks being the lowest since 1955. (On the Continent of Europe the disease has greatly diminished too and in France only a little more than 6,000 outbreaks were reported as compared with about 100,000 in 1957.)

ANTHRAX showed a sharp rise as compared with 1958. There were 263 outbreaks of which 105 were in Scotland. For the third year in succession SWINE FEVER increased, but only slightly. The demand for crystal violet vaccine is still going up. In the ten years, 1950-59, the annual issues have risen from 70,000 to 1,395,000 doses. Two outbreaks of ATROPHIC RHINITIS were reported and confirmed in pigs in 1959.

Bovine TUBERCULOSIS Eradication proceeded apace. During 1959 further strides in the eradication brought the plan close to fulfilment. At the end of the year some 75% of the cattle population were in attested areas which included about two-thirds of England and the whole of Scotland and Wales. Nearly ten million cattle or 95% of the National Herd were attested. In this period 346,675 store and fat cattle were imported into Britain from the Republic of Ireland—this figure including those which came *via* Northern Ireland. Of these 3,470 were accredited (*i.e.* attested) and 148,142 had passed a single tuberculin test immediately before shipment. The average incidence of reactors amongst once tested Irish cattle entering attested areas during 1959 was 2.9%.

The Report gives the regulations to prevent the introduction and the spread of disease and for the protection of animals during transit.

Nearly 50 pages are given over to the work of the Central Veterinary Laboratory at Weybridge and the Veterinary Laboratory at

Lasswade, and to the report on the Veterinary Investigation Service. Work on ARTIFICIAL INSEMINATION by the Reading Cattle Breeding Centre is included.

There are 25 statistical appendices and 83 publications by members of the staff are listed.—D. S. RABAGLIATI.

Great Britain. (1960). **The West of Scotland Agricultural College. Report on the work of the College for the year ended 30th September, 1960.** pp. 91. Glasgow: The College. [Veterinary investigations pp. 60-67.] 4210

The Veterinary Investigation Service examined 8,740 specimens at the Auchincruive Laboratory coming from a variety of animals, but largely from cattle. Amongst numerous diseases investigated were several outbreaks of PARASITIC ENTERITIS occurring in yearling steers during spring and early summer. The parasites chiefly concerned were *Ostertagia ostertagi* and *Nematodirus filicollis*. In one outbreak half of the affected stock died.

TICK-BORNE FEVER was diagnosed in a self-contained dairy herd. Since the beginning of August from 25 to 30 cows in all stages of lactation had a loss of milk yield and some pyrexia. Both milk yield and temperature returned to normal after 3 to 4 days.

Of 787 samples of faeces examined for JOHNE'S DISEASE 52 were positive, 111 suspicious and 742 negative.

LOUPING-ILL was widespread in hill lambs and cases occurred until the end of May. At least 14 outbreaks were diagnosed but probably many more occurred. A number of conditions were investigated in pigs.

COCCIDIOSIS and LEUCOSIS continued to be the main causes of death in poultry.

At the Sub-station in Oban 2,082 specimens were examined: LOUPING-ILL was an important cause of death in lambs (1-4 weeks of age).

The usual range of diseases were diagnosed in poultry. FOWL TYPHOID occurred in a deep-litter flock of 200 and after half the birds had died, it was decided to slaughter the flock.—D. S. RABAGLIATI.

Northern Ireland. (1960). **The research and experimental record of the Ministry of Agriculture, Northern Ireland for the year ended 31st December, 1959. Vol. IX. Part 2.** pp. 107-282. Belfast: Ministry of Agriculture. [Veterinary research pp. 227-242.] 4211

TRICHOMONIASIS in cattle has been virtually eradicated, and no outbreak was recorded in 1959. Only 4 outbreaks of VIBRIOSIS in cattle were confirmed.

GASTRO-ENTERITIS (228 cases), followed by PNEUMONIA (69) were the commonest causes of death in pigs sent for examination. SWINE FEVER was not recorded. *Clostridium welchii* was responsible for 43 of the cases of gastro-enteritis, salmonella 12, *Balantidium coli* 6, vibrio 2, and trichomonas one. Of 122 strains of *Escherichia coli* isolated, 47 were typed; many of them were resistant to the broad spectrum antibiotics, sulpha drugs and, in some cases, nitrofurans. Type OK177 was demonstrated in 18 cases of OEDEMA DISEASE, and OK4 in 12. Poliomyelitis indicative of TALKAN DISEASE was found in 5 piglets.

In 5,379 adult poultry FOWL PARALYSIS and LEUCOSIS were the chief causes of death, in 3,235 chicks caecal COCCIDIOSIS and respiratory conditions. FOWL TYPHOID is widespread, and was confirmed on 20 breeding farms.

Clostridium welchii infection, FASCIO-LIASIS and PNEUMONIA due to *Pasteurella haemolytica* were the most important diseases in sheep sent for examination. *Mycobacterium johnei* was demonstrated in 3 of 200 slaughter sheep. EPIDIDYMITIS usually due to streptococci and staphylococci was found in 20% of rams. *Brucella ovis* has not been encountered. There were 5 outbreaks of COPPER POISONING in sheep and 3 in calves caused by feeding pig meal containing copper.—M.G.G.

Nigeria. (1961). **Annual Report on the Veterinary Division of the Ministry of Animal Health and Forestry of the Northern Region of Nigeria for the year 1957-58.** pp. 22. Kaduna: Govt. Printer. 9d. 4212

The general disease position remained satisfactory in that although outbreaks of the major epizootic diseases did increase, in no case was mortality heavy and extensions of all outbreaks were limited. The year was marked by the integration of the Veterinary Department under the Ministry of Animal Health and Forestry.

The general pattern of RINDERPEST throughout the region differed little from that of the previous year. A total of 360 outbreaks occurred and 819,953 cattle were immunized. BOVINE CONTAGIOUS PLEUROPNEUMONIA still remains a major issue in Bornu Province where it is endemic. In 212 outbreaks, 2,655 animals died.

The control of TRYPANOSOMIASIS still places a heavy strain on the resources of the Provincial veterinary staff, the number of treatments reaching 771,438 as compared with 578,685 in 1956-57. Both ethidium chloride and quinapyramine sulphate were in common use.

Among bacterial diseases the most commonly diagnosed was BLACKLEG but there were 69 deaths from ANTHRAX out of 13 outbreaks. Accurate data on TUBERCULOSIS of livestock are still lacking, most cases having been diagnosed at slaughter.

EPIZOOTIC LYMPHANGITIS was again a frequent disease where horses were numerous. TRYPANOSOMIASIS continued to be diagnosed in areas where contact with *G. palpalis* and *G. tachinoides* was possible.

—D. S. RABAGLIATI.

Western Nigeria. (1961). **Annual report of the Livestock Division of the Ministry of Agriculture and Natural Resources, 1958-59.** pp. 38. Ibadan: Govt. Printer. 1s. 4213

On April 1st 1958 the Department of Agriculture was split up into three main divisions covering Extension, Research and Livestock. The main limitation on the activities of the Division has been the acute shortage of Livestock and Veterinary Officers.

The most serious cattle diseases were two outbreaks of RINDERPEST, six deaths from BLACKLEG and one outbreak of HAEMORRHAGIC SEPTICAEMIA in a herd of 37 animals, all of which were affected.

In sheep and goats four main conditions occur, ENTERITIS, PNEUMONIA, FOOT ROT and DERMATITIS. The first two conditions have shown response to sulphadimidine.

Poultry suffer from FOWL POX, VISCERAL LYMPHAMATOSIS and COCCIDIOSIS.

TRYPANOSOMIASIS is found in all parts of the region and cattle, horses, pigs and dogs have been treated for it.

RABIES vaccination is done free in all classes of economic livestock and, because of public health risk, dogs and cats.

A regional diagnostic unit was completed during the year but shortage of professional staff has prevented it from being opened. The Report contains a number of statistical tables.

If the Region is to be satisfactorily served, eight veterinarians are required for duty in the Provinces.—D. S. RABAGLIATI.

Zanzibar Protectorate. (1960). **Annual Report of the Department of Agriculture for the year**

1959. [Briant, A. K.] pp. 44. Zanzibar: Govt. Printer. Shs. 2. [Items of veterinary interest pp. 24-26.] 4214

There was no change in the strength of the Veterinary Section of the Department and it continued to provide veterinary attention at five centres in Pemba and Zanzibar. There were no outbreaks of contagious disease during the year. TUBERCULOSIS was seen in three cows; and one bull died from the disease.

Prophylactic treatments included 3,418 trypanosome injections with antrycide prosalt and 150 with prothidium as well as 2,234 vaccinations against NEWCASTLE DISEASE in poultry.

Dipping and spraying against tick-borne diseases continued. Gammexane (BHC) was in general use for district spraying; toxaphene was also used but was less efficient.

BABESIOSIS is not a very important disease in native cattle kept in rural environment but it is invariably severe in high grade cattle of the commercial dairy herd and in the dipped or sprayed zebu herds of the Department. So far there is no sign of resistance of cattle ticks to the acaricides.

The blood of wild animals has been examined for trypanosomes. If *T. simiae* is not present and is capable of causing mortality in wild bush pigs, its introduction might be a means of destroying wild bush pigs which act as trypanosome carriers.

EPIZOOTIC LYMPHANGITIS which has been diagnosed clinically was confirmed in a donkey.

Some heavy losses from NEWCASTLE DISEASE occurred in Zanzibar, but Pemba apparently remained free.—D. S. RABAGLIATI.

BOOK REVIEWS

✓ Butler, E. J. & Bisby, G. R. Revised by Vasudeva, R. S. (1960). **The fungi of India.** pp. ix+552. New Delhi: Indian Council of Agricultural Research. Rupees 45.50. 4215

This book records nearly 4,000 species of fungi and it has a bibliography of 1,500 references. It is written mainly for the plant pathologist and there appears to have been little attempt to include animal pathogens. For example, there is no mention of the reports from India of *Histoplasma farcinimosum* (Singh, 1956 and others), *H. capsulatum* (Shortt, 1923), *Nocardia farcinica* (Holmes, 1908 and Raymond, 1910), actinomycosis, and dermatophytes of animals. Rao's work on rhinosporidiosis of cattle (1938) is listed in the bibliography but not cited in the text.

—R.M.

Smythe, R. H. (1961). **Animal vision. What animals see.** pp. 250. London: Herbert Jenkins. 25s. 4216

This book deals with the types of eyes that exist in the animal kingdom, the influence of vision on animal behaviour; and the types of image that animals might perceive. It is written in simple language and is designed for the general reader. There are 102 illustrations based on sketches drawn by the author. Veterinary surgeons will find this book easy to read, and it is packed with interesting information.—R.M.

Bressou, C. (1961). Aide-mémoire d'ostéologie comparée des animaux domestiques. [Guide

to comparative osteology of the domestic animals.] pp. 110. Paris: Vigot Frères. 2nd Edit. 4217

This guide for veterinary students contains basic information on anatomy of the skeleton and species differences in horse, ox, goat, pig, dog, cat and rabbit. There is also a section on birds. The text is accompanied by 245 drawings.—R.M.

Lerche, M., Bartels, H. & Kelch, F. [Edited by.] (1961). A. Schroeter/M. Hellich. Das Fleischbeschaugesetz, nebst zusätzlichen Verordnungen und Gesetzen, mit Erläuterungen. Teil III. [Meat inspection law, with explanations. Part III.] pp. vii+186. Berlin (& Hamburg): Paul Parey. 7th Edit. DM 22. 4218

For reviews of Parts I and II of this four-volume work, see *V.B.* 30, 312 and 31, 1666. Part III deals with Section B of the German meat inspection law (instruction and examination of meat inspectors and trichinella inspectors) and also new regulations about the inspection of imported meat and methods for cooked and pickled meat. There are notes on examination of animals that have been used for preparation of sera and vaccines.—R.M.

Lane-Petter, W. (1961). **Provision of laboratory animals for research: a practical guide.** pp. xii+147. Amsterdam (London, New York & Princeton): Elsevier Publishing Company. 20s. 4219

This monograph is written for depart-

mental heads and scientific administrators who are responsible for the provision of laboratory animals. The first 4 chapters review the uses of laboratory animals, their sources and cost, and the increasing demand both for quantity and for quality. The 7 main chapters deal with the control of the quality of laboratory animals, with regard to genetics, health, nutrition, physical environment, and the care that they receive, the qualifications and training of animal technicians, the technique of producing laboratory animals of high quality in two stages; the primary type colony and the production units, and the functions and advantages of national laboratory animal centres. The final chapter discusses humane considerations, legal control, and public relations. A bibliography of the most important standard works on laboratory animals and a subject index are appended.

—M.G.G.

Broustail, M. (1961). *La souris de laboratoire et son élevage. [The breeding and management of laboratory mice.]* pp. 70. Paris: Vigot Frères. 2nd Edit. 4220

This book covers the general principles of the breeding, nutrition and management of laboratory mice, and describes the different diseases and parasites.—M.G.G.

Bonadonna, T. (1961). *Viaggio "zootecnico" intorno al mondo in Asia e nelle Americhe. [Report on a tour to study animal husbandry in Asia and the Americas.]* pp. xvi + 311. Milan: Edizioni "Progress Zootecnico". 4221

This is a collection of 41 papers, which have been published in Italian agricultural journals, of the author's impressions of animal husbandry and related topics in India, the Philippines, Japan and the South American countries. There are 49 illustrations.—R.M.

BOOKS RECEIVED

[Notice of recently received books in this list does not preclude review]

Habermehl, K.-H. (1961). *Die Altersbestimmung bei Haustieren, Pelztieren und beim jagdbaren Wild. [Determination of age in domestic animals and poultry, fur-bearing animals and game animals and birds.]* pp. 223. Berlin (& Hamburg): Paul Parey. DM 25.80.

Hoffmann, G. (1961). *Histologischer Kurs. Kurze Einführung in die Histologie und mikroskopische Anatomie der Haus- und Laboratoriumstiere. Teil II. Mikroskopische Anatomie. [Histology of domestic and laboratory animals. Part II. Microscopic anatomy.]* pp. viii + 159. Jena: Gustav Fischer. DM 31.70.

Kauffman, F. (1961). *Die Bakteriologie der Salmonella-Species. [Bacteriology of Salmonella.]* pp. 255. Copenhagen: Munksgaard. Dan. Kr. 48.

Noble, E. R. & Noble, G. A. (1961). *Parasitology: the biology of animal parasites.* pp. 767. London: Henry Kimpton. 82s. 6d.

Waterson, A. P. (1961). *Introduction to animal virology.* pp. viii + 96. Cambridge: University Press. 22s. 6d.

Wright, J. G. & Hall, L. W. (1961). *Veterinary anaesthesia and analgesia.* pp. viii + 386. London: Baillière, Tindall & Cox. 5th Edit 37s. 6d.

Zumpt, F. [Edited by] (1961). *The arthropod parasites of vertebrates in Africa south of the Sahara (Ethiopian region). Volume I (Chelicerata).* pp. 457. Johannesburg: South African Institute for Medical Research. R6.00.

AUTHOR INDEX

(The numbers refer to abstracts and not to pages. Where a page number appears after an author's name it refers to an entry in the list of books received)

- v. d. Aa, R., 3509.
Aalbers, J. G., 2370.
Aalund, O., 929.
Aanes, W. A., 2321.
Abbot, A., 3563.
Abbott, U. K., 2021, 4149.
Abdel Aziz, A. H., 3612.
Abdel Ghaffar, S., 3520.
Abdel-Raouf, M., 3087, 4174.
Abdulla Khan, C. K., 1448.
Abe, N., 26.
Abell, M. R., 1708.
Aberg, B., 191.
Abeyseena, F. A., 471.
Abinanti, F. R., 1467, 2217, 2926, 2927, 3592, 3595.
Ahlett, R. E., 1490, 1815, 3971.
Abou Akkada, A. R., 92.
Abplanalp, H., 4149.
Abramov, I. V., 2903.
Abrams, J. T., 4083.
Abreu Lopes, J. A., 3842.
de Abreu Martins, I., 3219.
Adair, J., 186.
Adams, C. E., 958.
Adams, W. V., 2456, 2873.
Adams-Mayne, M., 1639.
Adamson, G. E., 2345.
Adawy, A. T., 3428.
Adelaar, T. F., 1756, 1939.
Adinarayanan, N., 3866.
Adlan, A. M., 3240.
Adler, H. E., 683, 691, 3917.
Adler, J. H., 1295, 1296, 1297, 3326, 4121.
Aehnelt, E., 2380.
Affleck, H., 3061.
Aftosmis, J. G., 3554.
Agababayan, M. M., 989.
Agresti, A., 504, 2532, 2657.
Agrimi, P., 633, 1681.
Aguggini, G., 3463, 3464.
Aguirre, H., 106.
Ahlulwallia, S. S., 148.
Aikatt, B. K., 1055.
Aikawa, J. K., 874, 875.
Ainsworth, G. C., 2029, page 235.
Airapetyan, V. G., 427.
Aisen, E. A., 516.
Aitken, R. N. C., 260.
Aitken, T. H. G., 2522.
Ajankeye, S. M., 2443.
Ajello, L., 2467, 2469, 2470, 3200.
Ajello, P., 2261.
Akaike, Y., 3132.
Akao, Y., 128.
Akasawa, S., 2133.
Akester, A. R., 939.
Akiba, K., 2502.
van den Akker, S., 715, 745, 887.
Akkermans, J. P. W. M., 889.
Aksel, A., 2464.
Aktan, F., 326.
Aktan, M., 326.
Akulov, A. V., 1411.
Alami, S. Y., 1674.
Albertini, A., 2771.
Alberts, J. O., 3140, 3524.
Albrecht, P., 3246.
Albright, J. L., 1883, 1954, 2366.
Albu, T., 2937.
Al-Dabbagh, M. A., 2898, 3932, 3933.
Aleandri, M., 342.
Aleraj, Z., 418.
Alexander, T. J. L., 3364.
Alexandrov, N. I., 1399.
Alibasoglu, M., 4050.
Alcanta, J. E., 4034.
Aliiev, A. A., 248.
Allcroft, R., 2275, 2668, 3384, 4113.
van Allen, A., 3977.
Allen, D. M., 569.
Allen, F. M., 1886.
Allen, M. R., 4128.
Allen, R., 413.
Allen, R. C., 3513.
Allen, R. S., 855.
Allen, R. W., 4042.
Allen, S. H., 3028.
Allen, T. J., 1252.
Allison, A. C., 136.
Allsop, P. J., 2950.
Almáasy, K., 3225.
Almejew, C., 1688, 4085.
Almlöf, J., 1928.
Alosi, C., 1430.
Alsop, J., 1508.
Alston, J. M., 2454.
Altenkirch, W., 1037.
Altucci, P., 2200.
Alves de Cruz, A., 2123.
Amaïou, P., 174.
Amerault, T. E., 2847, 3880.
Amies, C. R., 3582.
Amin, A., 1831.
Amir, D., 3096.
Amirov, V. K., 2824.
D'Amore, A., 398.
Amoroso, E. C., 3780.
Amtower, W. C., 2938.
Anan'ev, V. A., 437, 438.
Anastoss, G., 800.
Anczykowski, F., 341.
Andersen, A. C., 3049.
Andersen, E. H., 4010.
Anderson, E. S., 1288, 2439, 2837.
Anderson, G. K., 331.
Anderson, G. R., 2797.
Anderson, G. W., 2471, 3903.
Anderson, J. F., 3639.
Anderson, J. L., 2290, 3801, 4006.
Anderson, J. R., 2173.
Anderson, R. R., 906.
Anderson, W. A., 963.
Andersson, N. S. E., 4134.
Ando, K., 3132.
Andrade, S. O., 529.
Andrade dos Santos, J., 4090.
André, J., 134.
Andreev, K. P., 4011.
Andreou, C., 1254.
Andrewes, C. H., 1794.
Andrews, H. L., 4102.
Andrews, M. F., 329.
Andriyan, E. A., 3040.
Andrus, S. B., 3022.
Angeloff, S., 2870.
Anghe, V., 1138.
Annau, E., 2843.
Annisson, E. F., 2677, 2741, 3332.
Anthony, D. J., 3117, page 482.
Anthony, D. W., 3287.
Anthony, H. D., 1069.
Anzai, H., 628.
Aoyama, Y., 2579.
D'Apice, M., 349.
Appasov, R. N., 1732.
Appleby, E. C., 1247.
Appleyard, G., 2916.
Archer, J. F., 3500.
Archer, O., 1832.
Archer, R. K., 1269, 3103, 4135.
Archibald, J., 146.
D'Arcy, P. F., 1952.
Arditi, E., 1513.
Arima, J., 3478.
Armbruster, O., 731, 1788.
Armour, J., 2989, 3652.
Armstrong, D. G., 1597.
Armstrong, J. A., 1794.
Armstrong, W. H., 1504.
Arnall, L., 1973, 3403.
Arnold, J., 2780.
Arnold, G. W., 1646.
Aronson, A. L., 1937.
Aronson, F. R., 1831, 2588.
Aronson, M., 1730.
Arrovo, G., 332.
Arthur, B. W., 1992, 3279, 4046.
Arty, L., 2335, 4184.
Asahi, O., 956.
D'Ascani, E., 3474.
Ascarelli, I., 561.
Ascione, L., 2584, 2700.
Asdell, S. A., 2006.
Ash, L. R., 4020.
Ash, R. W., 2739, 3774.
Ashdown, R. R., 271.
Ashida, K., 293, 954, 955, 956.
Ashton, G. C., 274, 3436.
Ashton, W. M., 1565.
Ashwood-Smith, M. J., 2892.
Ashworth, C. T., 2349.
Aspiotis, N., 1254.
Assali, N. S., 1270.
Assimakopoulos, C., 4059.
Asso, J., 603, 723, 3217.
Atanasii, P., 3224.
Atanasov, I., 2117.
Atchison, M. M., 15.
Atkins, N., 1351, 1352.
Atkinson, J. W., 3786.
Atmadilaga, D., 3811.
Aubrey, J. N., 962.
Audebaud, G., 134.
Audi, S., 418.
Augustinsson, K.-B., 1946.
Ault, W. C., 2663.
Ausherman, R. J., 2467, 2469.
Austwick, P. K. C., 1403.
Avampato, J. E., 774.
Averich, E., 2969.
Avery, R. J., 1302, 2182, 2730, 3386.
Awad, F. I., 1065.
Axelsen, A., 2585.
Axford, R. F. E., 4120.
Ayalon, N., 1296, 1701.
Aycardi, J., 3927.
Ayfantis, S., 3370.
Ayres, P. E., 969.
Azimov, S. A., 1164.
Azuma, R., 2060, 3132.
Babicheva, A. J., 3162.
Babin, Y. A., 3709.
Babini, A., 3573.
Babudieri, B., 1047, 3176.
Bach, S. J., 1910.
Bache, C. A., 1989.
Bachinskii, V. P., 3665.
Bachnick, G., 1637.
Bachrach, D., 4153.
Bachrach, H. L., 1095, 1099, 1787, 2156.
Backhouse, K. M., 272.
Backhouse, T. C., 4091.
Bacques, C., 3743.
Baczyński, Z., 1821.
Bader, F., 1049.
Bader, J. P., 2958.
Badman, H. G., 2388, 3052.
Baehler, J.-F., 2018.
Bailey, C. B., 4093.
Bailey, K. P., 383.
Bailey, R. W., 772.
Bailey, W. S., 2990, 4036.
Baïmukambetov, K., 1608.
Bain, R. V. S., 35, 630, 1013, 2492, 3449, page 432.
Bainborough, A. R., 1302.
Bainbridge, J. R., 1856.
Baisden, L. A., 830, 2421.
Baiturina, O. S., 516.
Bainusz, E., 185.
Baker, B. E., 3274.
Baker, E. F., 2216.
Baker, G., 2338, 3771, 3772.
Baker, J. A., 1465, 1477, 1481, 2981, 2968.
Baker, J. A. F., 2230.
Baker, L. A., 1490, 1815, 2948, 3971.
Baker, N. F., 3566.
Bakos, K., 423, 2178.
Bakoss, P., 2875.
Bakshi, S. N., 59, 2849.
Bakshi, S. N., 8189.
Balázs, J., 421.
Baláz, A., 1792.
Balazs, T., 3194.
Baldaev, S. N., 3354.
Baldwin, D. B., 2909.
Bale, W. F., 1194.
Ballantyne, E. E., 2751.
Ballarini, G., 597, 3563.
Balows, A., 2467.
Baluda, M. A., 3622.
Bane, A., 2762.
Banerjee, A. K., 550.
Bangán, S., 988, 1248.
Bangham, D. R., 139.
Bankowski, R. A., 451, 1140, 1145, 3981.
Banks, A. W., 2629.
Banks, I. S., 2523.
Bannister, G. L., 759, 2209, 2945, 3177, 3258, 3602.
Baradnay, G., 4153.
Barber, E. S., 3686.
Barber, T. L., 2943.
Barbesier, J., 2114, 2122.
Barbiera, A., 3514.
Barbu, E., 3633.
Bardens, R., 2697.
Bardens, G. W., 2697.
Bardens, J. W., 2697.
Bardwell, R. E., 2675.
Barlow, J. L., 3609.
Barlow, R. M., 1563.
Barmoscé, B., 3547.
Barnes, C. M., 3404.
Barnes, E. M., 1288.
Barnes, F. D., 3973.
Barnes, L. E., 693, 1767.
Barnet, A. J. G., 3451, page 300.
Barnett, B. D., 1902.
Barnett, S. F., 382, 1036, 2147, 2493.
Baron, S., 791, 3992.
Barr, R. B., 738.
Barreira, F., 4104.
Barrentine, B. F., 1558.
Barrett, A. M., 1153.
Barrett, J. F., 2770.
Barron, C. N., 845.
Barron, D. H., 2354, 2355.
Barros Santos, C., 3331.
Le Bars, H., 3684, 3828, page 300.
Barson, G. F., 1593.
Bartels, H., 1666, 3764, 4218, pages 106, 562.
Barth, K., 3068.
Bartha, A., 110, 2509.
Bartley, E. E., 858, 3015, 3328.
Bartulić, V., 2232.
Baruah, H. K., 3902.
Basch, H. I., 2210.
Basova, N. N., 135, 1510.
Basse, B., 1207.
Basse, A., 1493.
Bassett, E. G., 2362.
Bassini, E., 2293.
Bassiouni, A., 3166.
Bastalić, S., 1732.
Bastarrachea, F., 3850.
Basz, I., 66.
Batchelor, A., 1259.
Bateman, J. B., 1357.
Bateman, N., 4014.
Bates, F. W., 1933.
Bates, J. L., 1696.
Bath, I. H., 3084.
Bather, R., 1198.
Battaglia, F. C., 2355.
Batten, J. C., 985.
Battistacci, M., 3593.
Batty, I., 1750, 2461.
Bauch, R. J., 4009.
Bauer, D. C., 2867.
Bauer, D. I., 3976.
Bauer, F., 1079.
Baum, G. J., 177, 936.
Baumann, J. B., 3270.
Baxter, J. T., 1761.
Baynes, I. D., 1408.
Bazanov, N. U., 1606, 1617.
Bazhenov, A. N., 2274.
Beam, R. E., 3142.

- Beamer, P. D., 3140.
 Beard, D., 492.
 Beard, D. C., 4196.
 Beard, J. W., 492.
 Bearup, A. J., 157.
 Beasley, J. N., 2480.
 Beattie, H. E. R., 353.
 Beattie, J., 2489.
 Beaudeau, G. S., 492.
 Beauregard, M., 1199.
 Beaver, D. L., 2285.
 Bech, V., 1131.
 Becht, H., 474.
 Beck, G., 1922.
 Beck, W., 731.
 Beckenhauer, W. H., 1806.
 Becker, C., 492.
 Becker, C. H., 433, 2159.
 Becker, E. L., 1512, 8271.
 Becker, E. R., 2486.
 Becker, P., 3581.
 Becker, R. B., 3439.
 Becker, W., 3029.
 Becze, J., 572, 3796.
 Bedell, D. M., 1779.
 Bederke, G., 2049.
 Bedryńska-Dobek, M., 3911.
 Beer, J. Z., 3727.
 Beerwerth, W., 322, 614, 1000.
 Beesley, W. N., 2973.
 Beghelli, V., 3409.
 Behrens, H., 809.
 Belharz, R. G., 4139.
 Belharz, S., 2673.
 Van Bekkum, J. G., 1093.
 Bekš, L., 2175.
 Bélanger, L. F., 3024.
 Bell, D. J., 2575.
 Bell, D. S., 3429.
 Bell, F. R., 270.
 Bell, M. C., 3379, 4078.
 Bell, R. R., 1178, 1179, 1180.
 Bellani, L., 170.
 Belle, E. A., 2522.
 Belling, T. H., Jr., 3809.
 Bellis, D. B., 2279.
 Bello, T. R., 3660.
 Belouitch, M., 3360.
 Belyavin, G., 1126.
 van Bemmél, A. C. V., 203.
 Bemrick, W. J., 2501.
 Benčević, K., 467.
 Ben David, B., 3143.
 Benditt, E. P., 3742.
 Bendixen, H. C., 3342.
 Bendixen, H. J., 491.
 Bendtsen, H., 65.
 Benedek, G., 1692.
 Benedict, A. A., 1822.
 Benedict, W. H., 900.
 Bengelsdorf, H. J., 3230, 3231.
 Bengtsson, L. P., 2015.
 Benjamin, N. R., 3555.
 Benko, L., 2533.
 Benndorf, E., 434.
 Bennett, C. A., 1585.
 Bennett, G. F., 1771.
 Bennett, G. H., 1088.
 Bennett, J. M., 2198.
 Bennett, J. P., 567, 3788, 3789.
 Bennette, J. G., 133.
 Ben-Porat, T., 2160.
 Bensley, S. H., 1982.
 Benson, R. E., 968.
 Benson, W. W., 3998.
 Bentthien, H.-A., 534.
 Benton, W. J., 687.
 Bentzon, M. W., 1685.
 Beraldo, W. T., 4051.
 Beran, G. W., 771, 1437.
 Berbinschl, C., 430, 1019.
 Berbinski, K., 3579.
 Bercan, A., 2937.
 Berecz, L., 2511.
 Bergamaschi, M., 3463, 3464.
 Berge, E., 2037, page 235.
 Berge, T. O., 2523.
 Berger, L., 1978.
 Berk, R., 1515.
 Berman, A., 3756.
 Berman, D. T., 607.
 Berman, S., 3955.
 Bermejo Lozano, J., 2466.
 Bernardin, M., 3818.
 Bernhardt, W., 3345.
 Berousek, E. R., 4185.
 Bernier, H. H., 2405, page 300.
 Berry, R. O., 576.
 Bertok, E. I., 3274.
 Bertoni, L., 597.
 Bertschinger, H. U., 8510.
 Bésiat, P., 2584.
 Besprozvannyi, B. K., 437, 438.
 Bessmertnykh, A. A., 764.
 Better, N., 1351.
 Bettinotti, C. M., 106.
 Betts, A. O., 125, 3969.
 Beuche, H., 3636.
 Beutner, E. H., 2386.
 Beveridge, W. I. B., 880.
 Beverley, J. K. A., 1087, 1088.
 Bevis, M. A., 1593.
 Beye, H. K., 3562.
 Beyler, A. L., 910.
 Bezeau, L. M., 2665, 4093.
 Bhatia, B. B., 482, 1162.
 Bhatnagar, D. S., 543, 3397, 4146.
 Biancardi, G., 1359.
 Biberstein, E. L., 40, 2067, 2850.
 Bica-Popli, V., 3862.
 Bicknell, F., 2793.
 Biegeleisen, J. Z., Jr., 3881.
 Bielez, P., 2545.
 Bienvenu, R. J., Jr., 3511.
 Bier, A. M., 3762.
 Bierer, B. W., 912, 913, 1061, 2408.
 Bigalke, R. D., 1425.
 Biggs, P. M., 4001.
 Bigland, C. H., 3405.
 Biguet, J., 160.
 Bijlenga, G., 3619.
 Bilal, V. I., 363.
 Bilbey, D. L. J., 4195.
 Bilstad, N. M., 2588.
 Binato, G., 1698.
 Bindrich, H., 1445, 1470.
 Binns, W., 968, 3065.
 Biondi, E., 611.
 Birch-Andersen, A., 4188.
 Bird, H. R., 2324.
 Birkett, J. D., 589.
 Birnaure, G., 3248.
 Biro, I., 1783.
 Bisbini, P., 1751, 1752.
 Bisby, G. R., 4215, page 686.
 Bischoff, J., 3409.
 Bishop, D. W., 282, 3634, 4002.
 Bishop, J. A., 4094.
 Bisping, W., 2086.
 Di Bitetto, D. B., 2470.
 Bitman, J., 2373.
 Bittle, J. L., 3970.
 Björkman, N., 2744.
 Black, F. L., 3268.
 Black, J. M., 3471.
 Blackburn, P. S., 356, 3358.
 Blackmore, D. K., 3035.
 Blackmore, J. S., 1109.
 Blackshaw, A. W., 278, 1291, 1632.
 Bladen, H. A., 2482.
 Blagoveshchenskii, V. A., 2104.
 Blair, J. E., 3839.
 Blamberg, D. L., 3020.
 Blanc, G., 2584, 2700.
 Blanch, E., 3731.
 Blanco Loizelier, A., 2478.
 Blasković, D., 2960.
 Blaxter, K. L., 928, 1597, 4077.
 Blazek, K., 541, 1428.
 Blazhevich, G. M., 1228.
 Blechner, J., 2355.
 Blendon, D. C., 2129.
 Bldaru, T., 4058.
 Bligh, J., 3077.
 Blincoe, C., 888, 3389.
 Blinov, P. N., 3041.
 Blohel, H., 607, 1955.
 Bloch, B., 2718.
 Bloch, H., 315.
 Blom, E., 1441, 4188.
 Blomberg, H., 8.
 Blommer, E., 3838.
 Blood, D. C., 295.
 Blum, A. S., 4161.
 Blumenberg, F. W., 235, 236.
 Blundell, G. P., 2307.
 Blunt, M. H., 2728, 2729.
 Bobby, F. C., 2707.
 Bobin, A., 636.
 Boca, R., 1248.
 Boda, K., 2736.
 Boddeke, K., 1847.
 Bodenstein, C., 3287.
 Bögel, K., 424, 3960.
 Böhm, H., 410.
 Boehringer, E. G., 85.
 de Boehringer, I. K., 85.
 Bömer, H., 891, 1923, 3340.
 de Boer, C. J., 2156.
 Börger, K., 1726, 3878.
 Boev, S. N., 2613.
 von Bogaert, L., 3843.
 Bogdán, E., 2510.
 Bogdan, J., 1876, 1737, 2610.
 Boger, W. P., 604.
 Boháč, J., 419, 1800.
 Bohlander, H. J., 653, 1042.
 Bohman, V. R., 2750.
 Boiko, A. A., 393, 2152.
 Bojaili, L. F., 3850.
 Bojinović, M., 2323.
 Bokelman, D. L., 2865.
 Bokkenheuser, V., 2222.
 Bolaños, R., 332.
 Boldisár, H., 3356.
 Bolliger, A., 4091.
 Bollwahn, W., 2269, 4096.
 Bolz, W., page 235.
 Bonadonna, T., 4221, page 686.
 Bonaduce, A. L., 171, 2261.
 Bonar, R. A., 492.
 Bonchev, N., 1480, 1485.
 Bond, J., 2373.
 Bond, V. P., 1239.
 Bondareva, V. I., 2613.
 Bondi, A., 561.
 Bonner, R. B., 194, 3810.
 Bonner, R. D., 3549.
 Del Bono, G., 215, 3333.
 Bontscheff, N. F., 2045.
 Bonventre, P. F., 2046.
 Bood, P. H., 745.
 Boogaerdt, J., 1206.
 Bool, P. H., 1085.
 Booth, A. N., 496.
 Booth, N. H., 261, 1976, 4133.
 Boothe, A. D., 682.
 Boray, J. C., 2607.
 Bordet, R., 3818.
 ter Borg, H., 2974.
 Borg, K., 3540.
 Borg, U., 2142.
 Borgatti, G., 3409.
 Borgsen, H. C., 1433.
 Borghi, G., 3578.
 Borgman, R. F., 243.
 Borg-Petersen, C., 2453.
 Borisov, A. M., 361.
 Borman, G., 1008.
 Van Den Born, J.-M., 2399.
 Bornstein, S., 561.
 Borodulina, N. A., 3536.
 Borzemska, W., 3616.
 Bosgra, O., 625.
 Bosticco, A., 1894.
 Bouckaert, J. H., 1058, 1273, 1276, 2661, 2769.
 Boulanger, P., 112, 759, 2209, 3177, 3602.
 Bouley, G., 38.
 Bourdier, P., 1226.
 Boursnell, J. C., 587.
 Bouvier, C., 3951.
 Rouvier, G., 1757.
 Rowden, R. S. T., 1492.
 Rowen, H. J. M., 4203.
 Rowland, J. P., 2280, 3686.
 Rovd, E. M., 3393.
 Rovd, H., 657, 2772.
 Rovd, J., 862.
 Rowden, S. V., 1511.
 Royer, F., 3128.
 Royer, G. S., 1833.
 Brachman, P. S., 15.
 Braco-Forte, M. da C., Jr., 342.
 Bradbury, J. T., 2018.
 Braden, A. W. H., 2770, 3794.
 Bradish, C. J., 1786.
 Bradley, D. E., 1041.
 Bradley, O. C., 599.
 Brady, U. E., Jr., 1992.
 Brakenridge, D. T., 649.
 Brambell, F. W. R., 1729.
 Brambell, M. R., 1171.
 Bran, L., 2937, 2957, 3248.
 Brandes, D., 263.
 Brandes, H., 21.
 Brandy, C. A., 2403, page 300.
 Brandy, P. J., 333.
 Brás, M. B., 2655.
 Bratanovic, U., 511.
 Bratkovski, E. I., 2137.
 Braude, N. I., 3515.
 Braud, R., 2131, 2280, 3686.
 Braun, O. H., 1021.
 Braun, W., 1730, 3171, 3514.
 Brauner, I., 2557.
 Bray, R. S., 3939.
 Brazier, M. A. B., 2033, page 106.
 Bredeck, H. E., 1976.
 Breese, S. S., Jr., 2158.
 Breibart, S., 2745.
 Brenner, K. C., 4040.
 Brent, R. L., 2969.
 Brés, P., 207.
 Bressou, C., 4217, page 502.
 Brethour, J. R., 799.
 Breza, M., 1535, 1866.
 Brezány, D., 1901.
 Brezina, R., 3629.
 Briant, A. K., 4214.
 Bridge, P. S., 4083.
 Bridges, C. H., 1062, 3550.
 Bridges, C. A. E., 975, 2131.
 Briggs, D. R., 1038.
 Briggs, J. D., 1519.
 Briggs, M., 3996.
 Brightenback, G. E., 2874.
 Brill, J., 2821.
 Brinkman, D. C., 934.
 Brinkman, S., 2467.
 Brion, 2025.
 Brion, A., 431, 773, 861, 898, 1129, 1489.
 Britz, W. E., Jr., 4203.
 Broberg, G., 3681.
 Brochart, M., 2660, 4157.
 Brocklesby, D. W., 382, 1086, 2147, 3938.
 Brocksopp, R. E., 3016.
 Broda, E., 3455, page 52.
 Brodau, H., 2846.
 Brodey, R. S., 842.
 Brodie, B. O., 1954, 2366.
 Brodsky, M., 152.
 Brody, G., 831.
 Brody, S., 3431.
 Bröcker, P., 2773.
 Bromfield, S. M., 2672.
 Bronner, F., 180, page 300.
 Bronsch, K., 3068.
 Brook, P. J., 1950.
 Broom, J. C., 2868.
 Broom, W. A., 2390.
 Broome, A. W., 1354, 1355.
 Broome, A. W. J., 2631.
 Brotherston, J. G., 3861.
 Brougham, R. W., 1571.
 Broustail, M., 4220, page 502.
 Brown, A., 1144.
 Brown, A. L., 1806.
 Brown, A. M., 2343.
 Brown, A. W. A., 2228.
 Brown, D. H., 1575.
 Brown, F., 896, 897, 403, 8942.
 Brown, H., 3631.
 Brown, J. M. M., 2713.
 Brown, K. I., 2132.
 Brown, L. D., 857.
 Brown, M. L., 1139, 1877, 4055.
 Brown, N. K., 2963.
 Brown, R. D., 1114, 2176, 2534.
 Brown, R. G., 692.
 Brown, R. H., 1460.
 Brown, S. R., 3234.
 Brown, W. A. B., 4064.
 Brown, W. O., 2388, 3952.
 Brownlee, A., 1275, 3773.
 Bruchier, A., 1672.
 Brudnjak, Z., 514.
 Brüggemann, J., 3063.
 Brues, A. M., 1664.
 Bruhin, H., 2091.
 Brumfield, G. L., 3200.

- Brumfitt, W., 1020.
 Brundrett, H. M., 2594.
 Brunner, A., 446.
 Bruns, P. D., 875.
 Brunsdon, R. V., 2998, 2999, 3309.
 Brunson, J. G., 3870.
 Brush, M. G., 1283.
 Brutyan, A. S., 1237.
 Bryan, H. S., 967.
 Bryan, M. W., 1534.
 Bryans, J. T., 352.
 Bryant, M. P., 1558, 2482.
 Brydon, P., 2616.
 Buchanan-Davidson, D. J., 1400, 1401.
 Buchholz, V., 3676.
 Buck, W. B., 143, 1252, 3065.
 von Buddenbrock, W., 2032, page 235.
 Budinger, J. M., 2320.
 Budowski, P., 561.
 Büchmann, E., 1441.
 Buchner, H. K., 3396.
 Bühlmann, X., 2001.
 Bühner, F., 2608.
 von Bülow, V., 886.
 Bürki, F., 1368, 1725, 1740.
 Buescher, E. L., 3979.
 Bugeac, T., 1019.
 Bugyaki, L., 3647.
 Bukulov, I. A., 1347.
 Bulanov, P. A., 1031.
 Buldakov, L. A., 1934.
 Bulgini, M. J., 3527.
 Buljević, S. M., 479.
 Bull, J. P., 924.
 Bull, L. B., 2710, 4127.
 Bullen, J. J., 2461.
 Bulling, E., 1709.
 Bumford, F. H., 15.
 Bunn, C. R., 1899.
 Buntain, D., 4112.
 Bunyan, J., 2676, 3703.
 Buonaccorsi, A., 212.
 Burch, O. W., 1955.
 Burden, E. H. W. J., 4111.
 Burdin, M. L., 4072.
 Burdon, K. L., 306.
 Burducea, O., 3134.
 Burdzy, K., 343, 3516.
 Burgdorfer, W., 2982.
 Burger, D., 2561.
 Burger, R. E., 4189.
 Burgisser, H., 530, 1429.
 Buri, H. H., 1029.
 Burmester, B. R., 1546, 1551, 1552.
 Burnett, F. M., 1833, 2970, 3115.
 Burnett, G. F., 3284.
 Burns, K. N., 4113.
 Burns, M. A., 1647.
 Burton, A. N., 3235.
 Burrows, R. B., 1168, 1181.
 Burrows, T. M., 1785.
 Burtcher, H., 746.
 Buriuana, L. M., 2380.
 Buryabash, F. N., 4052.
 Busch, W., 3167, 3509.
 Buschmann, H., 3761, 4159.
 Bush, L. J., 242.
 Bushland, R. C., 2752.
 Buslaev, M. A., 1446.
 Bussiéras, J., 1530.
 Bussolati, C., 3275.
 Bustad, L. K., 1585, 3404.
 Butler, E. J., 1563, 4215, page 686.
 Butler, G. W., 1571.
 Butler, H., 272.
 Butler, W. F., 1124.
 Butozan, V., 1476.
 Butterworth, E. M., 2375.
 Buttery, S. H., 368.
 Buttianx, R., 3149.
 Buttram, J. R., 3279.
 Buttrick, L., 631, 1248.
 Buxton, A., 1018.
 Buyske, D. A., 920.
 Buziassy, C., 1569.
 Byrne, J. L., 3141.
 Byrne, R. J., 2926.
 Cabassi, N., 1819.
 Cabasso, V. J., 774, 2949.
 de Cabrier da Silva, H. R. B., 2601.
 Cabrini, R. L., 2525.
 Cacchione, R. A., 3527.
 Calaby, J. H., 2563, 2701.
 Caldeyro-Barcia, R., page 562.
 Calet, C., 3781.
 Calhoun, J. C., 3524.
 Callis, J. J., 1095.
 Callow, L. L., 2491.
 Callstrom, R. C., 2310.
 Calnek, B. W., 2569.
 Calvert, C. C., 865.
 Camain, R., 207.
 Camand, R., 724, 730.
 Cameron, C., 1756.
 Cameron, G. R., 4109.
 Cameron, H. S., 2850.
 Campbell, B., 2352.
 Campbell, D. E. S., 1619.
 Campbell, E. A., 2706.
 Campbell, H., 641.
 Campbell, I. R., 1650.
 Campbell, J. A., 1171, 1223.
 Campbell, J. E., 2749.
 Campbell, J. G., 1255, 2575.
 Campbell, J. R., 1213.
 Campbell, R. C., 946.
 Campbell, R. M., 4168.
 Campbell, W. C., 1161, 4032.
 Canada, R. O., 3410.
 Canda, S., 1792.
 Canella, C. F. C., 4124, 4125, 4126.
 Cantoni, O., 294.
 Capps, W. I., 3262.
 Carbrey, E. A., 2872, 3175.
 Carda Aparici, P., 3331.
 Care, A. D., 134.
 Carithers, R. W., 1877, 4055.
 Carlile, J. J., 1315.
 Carlisle, C. H., 2463.
 Carlisle, H. N., 666.
 Carl, W. T., 1061.
 De Carlo, J. M., 2531.
 Carlotto, F., 3503.
 Carlson, C. H., 639.
 Carlson, H. C., 2464.
 Carlson, R. H., 4133.
 Carlson, W. D., 3136.
 Carlström, G., 132, 3431.
 Carmichael, A. G., 2228.
 Carmichael, L. E., 3973.
 Carnaghan, R. B. A., 3384, 3990, 4118.
 Carnes, W. H., 2231, 2282.
 Carp, N., 3248.
 Carpenter, C. M., 648.
 Carpenter, C. P., 1943.
 Carr, W. R., 1971.
 Carrière, L., 2450, 3245.
 Carrière, J., 3479.
 Carruthers, J. S., 3759.
 Carter, B. G., 2220.
 Carter, G. R., 35.
 Carter, L., 334.
 Cartridge, M. E. A., 3748.
 Cartwright, B., 397.
 Cartwright, G. E., 2281.
 Casady, R. B., 3339.
 Casals, J., 3953.
 Casarett, G. W., 1194.
 Casarosa, L., 3303, 3315.
 Cascelli, E. S., 3527.
 Casey, M., 3998.
 Casida, L. E., 1353, 1354, 1355, 3099, 3100, 3792.
 Cass, J. S., 1650.
 Du Casse, F. B. W., 8852.
 Castagnoli, B., 398.
 Castañeda García, J., 3218.
 Castel, P., 820, 2243.
 Castle, M. E., 3358.
 de Castro, S., 941.
 Catarsini, O., 387.
 Catellani, G., 1068, 2532.
 Cater, D. B., 3737.
 Catley, A., 4006.
 Catlin, J. E., 2259.
 Catron, D. V., 3631, 3687.
 Cavanaugh, J. B., 4132.
 Cavey, W. A., 1518.
 Cavrini, C., 1682, 1683, 1819.
 Cawse, P. A., 4208.
 Cayré, R. M., 2054.
 Ceccarelli, A., 726, 3539.
 Cecil, H. C., 2373.
 Cedro, V. C. F., 1378.
 Celer, V., 1336.
 Cernea, I., 631, 988.
 Cerná, J., 214.
 Cernohous, J., 4.
 Cesari, F., 3199.
 Chabassol, C., 636, 3302.
 Challey, J. R., 1083.
 Chalmers, M. I., 1204.
 Chalquest, R. R., 2479.
 Chamberlain, A. G., 2280.
 Chamberlain, W. F., 147.
 Chambers, V. C., 776, 777.
 Chambron, J., 443, 2170.
 Chance, C. M., 3025.
 Chancellor, L., 251.
 Chandler, P. T., 2301.
 Chandler, R. L., 23, 2057, 2820, 2936.
 Chang, P. W., 2203, 2572.
 Ch'ang, T. S., 4194.
 Chanoek, R. M., 2927.
 Chapman, N. F., 3667.
 Chapman, W. G., 2905.
 Chappell, W. A., 1111.
 Charalambijev, C., 116.
 Charles, J. A., 1308.
 Charlet-Léry, G., 253.
 Charnot, Y., 4152.
 Charpentier, J.-O., 88.
 Charton, A., 1972, 2679.
 Chatupale, W. V., 2443.
 Chaudhari, R. P., 460.
 Chaudhary, N. C., 543, 3397.
 Chaudhury, R. R., 531.
 Chauvrat, J., 338, 1343.
 Chawla, L. R., 1154.
 Cheah Phae Phay, 1011.
 Cheatum, E. L., 2949.
 Cheeseman, G. C., 975.
 Cheli, R., 164.
 Chen Yi-teh, 1453.
 Cherchenko, I. I., 2093.
 Cherkasov, V. A., 1579.
 Cherkasskii, E. S., 3161.
 Chernikova, T. M., 1510.
 Chernov, V. S., 3557.
 Chernysheva, M. I., 2097.
 Cherry, W. B., 3836.
 Chesley, L. C., 1270.
 Chester, D. K., 1775.
 Chew, R. M., 3079.
 Cheyroux, M., 130, 2946.
 Chhay-Hancheng, 820, 2243.
 Chieffi, A., 947.
 Chiesa, F., 3463, 3464.
 Chilwell, E. D., 1993.
 Chobert, 2025.
 Chock, Q. C., 1846.
 Chodkowski, A., 1375, 3882.
 Chodroff, S., 230.
 Choh Hao Li, 2742.
 Chomiak, T. W., 1505.
 Chong, M., 1846.
 Choquette, L. P. E., 3141.
 Chow, T. L., 3969.
 Chowdhury, A. K., 550.
 Chowdhury, D. R., 3076.
 Christenberry, K. W., 900.
 Christensen, J. F., 3566.
 Christensen, N. O., 1641.
 Christensen, M. J., 3135.
 Christie, A. O., 392.
 Christie, G. S., 3746.
 Christie, M. G., 1539.
 Christodoulououlos, A., 3370.
 Christoph, H.-J., 2195.
 Chu, H. P., 2702.
 Chubb, L. G., 2682.
 Churchill, C. W., 2614.
 Chury, J., 1298, 2391.
 Chwalibac, J., 2886.
 Chwojnowski, A., 2838.
 Chyba, S., 3399.
 Cimino, G., 2121.
 Cinsader, B., 2920.
 Cirstet, I., 1488.
 Cisale, H. O., 1378.
 Claborn, H. V., 1991, 2752, 3991.
 Claeys, R., 1023.
 Clapham, P., 1181.
 Clapham, P. A., 3002, 4038.
 Clapperton, J. L., 1597.
 Clark, D. S., 634.
 Clark, D. T., 2894.
 Clark, L. G., 1045, 1380, 1381.
 Clark, R., 2716.
 Clark, W. N., 3925.
 Clarke, E. M. W., 943.
 Clarke, R. T. J., 1059, 2883.
 Clarkson, M. J., 706, 3083, 3935.
 Clarkson, T. B., 1892.
 Clausen, H., 3363.
 Claus, A., 3847.
 Claxton, J. H., 285.
 Claydon, T. J., 858, 3328.
 Clech, L., 3260.
 Clegg, E. J., 2383.
 Clegg, M. T., 290, 570.
 Clemente, J., 370, 888.
 Clifford, C. M., 600.
 Clifford, D. H., 4144.
 Clinger, D. I., 3483.
 Cliver, D. O., 1472.
 Clouston, J. R., 1211.
 Cluff, L. E., 3124, 3125, 3126, 3127.
 Cluzel, R., 3537.
 Cluzel-Nigay, M., 3537.
 Coatney, G. R., 3562.
 Cobbett, N. G., 2972.
 Cockburn, A., 3505.
 Codner, R. C., 3904.
 Coffin, D., 80.
 Coffin, D. L., 2457.
 Coggins, L., 2931.
 Coghlan, J. D., 1048.
 Cohen, D. W., 973.
 Cohen, J. O., 3836.
 Cohen, P., 573.
 Cohen, R. H., 2623.
 Cohn, C., 1893.
 Cohrs, P., 2061.
 Cole, C. R., 666, 710, 760, 1090, 1193, 2494.
 Cole, H. H., 290.
 Cole, R. K., 4202.
 Coleman, G. S., 391.
 Coleman, T. H., 2022.
 Coles, B. L., 1561.
 Colglazier, M. L., 151, 1855, 2646, 3003.
 Colichon Y., H., 1362.
 Collee, J. G., 2459.
 Collet, P., 3743.
 Collier, W. A., 745.
 Collins, C. H., 3859.
 Collins, G. W., 3005.
 Collins, R., 2725.
 Collombier, M., 3224.
 Colombo, S., 3728, 4106.
 Colvée, M. P., 3740.
 Coman, I., 1488.
 Comar, C. L., 3094, 3374, page 300.
 Combs, B. O., 965.
 Combs, G. E., 1207.
 Combs, G. F., 3020.
 Comfort, A., 351, 925.
 Comline, R. S., 3417.
 Compagnucci, M., 387, 1096, 1716, 2261, 3594.
 Condy, J. B., 1971, 2612, 2994, 3642.
 Conge, G. A., 3854.
 Connell, F. H., 1532.
 Connell, R., 461, 1199, 3235.
 Connolly, J. H., 3996.
 Connor, D. G., 2839.
 Conrad, H. R., 197.
 Conti, C. R., 3125, 3127.
 Cook, J., 1660.
 Cook, J. E., 4203.
 Cook, M. K., 2927.
 Coombs, R. R. A., 1153.
 Cooper, B. S., 2830.
 Cooper, G. N., 3466.
 Cooper, P. D., 2503.
 Coop, D. H., 4182.
 Copn, F. C., 1181.
 Cordero del Campillo, M., 2895, 2896.
 Cordy, D. R., 683.
 Cornelius, C. E., 3930, 4094.
 Cornell, R. G., 664.
 Corner, A. H., 2945, 3258.

- Cornette, M., 2679.
 Cornwell, R. L., 827, 828, 2640.
 Corrado, A., 1698.
 Corrêa, M. O., 349.
 Corrias, A., 1894.
 Corry, J. R., 3446.
 Corsico, G., 1024, 1728, 2309.
 Corstvet, R., 1140.
 Cortez, A., 1494, 2450, 3245.
 Corticelli, B., 1537.
 Corvazier, R., 130, 2946.
 Cosić, D., 1324.
 Cotchin, E., 837, 3007.
 Cottleer, O., 8543.
 Cottew, G. S., 3913.
 Cottral, G. E., 2909.
 De Cou, D. F., 1610.
 Couch, J. R., 188, 1232, 1907, 4100.
 Coulon, J., 3818.
 Coulson, C. B., 2659.
 Coulston, F., 910.
 Coupland, R. E., 2350.
 Courter, R., 1322.
 Courtieu, A.-L., 2066.
 Cousineau, J. G., 2871.
 Cover, M. S., 687.
 Cowan, I. M. T., 4204.
 Cowan, K. M., 755, 2130, 2542.
 Cowart, G. S., 3836.
 Cowie, A. T., 2791, 3760, 3819, 4158, page 300.
 Cox, B. E., 2909.
 Cox, D. D., 2144.
 Cox, D. F., 2296, 3802.
 Cox, D. H., 863.
 Crabb, W. E., 5, 3918.
 Crabo, B., 4173, 4174.
 Cragle, R. G., 2301, 2302, 2808.
 Craig, J., 2826.
 Craig, J. P., 2460.
 Craig, L. C., 2357.
 Craighead, J. E., 2188.
 Crandell, R. A., 778.
 Craplet, M. C., 3151.
 Crawford, E. M., 2214.
 Crawford, L. V., 2214.
 Crawford, R. D., 3164.
 Creasey, W. A., 3683.
 Crecelius, H. G., 664.
 Creek, R. D., 3020.
 Creel, R., 1915.
 Cresswell, E., 3075.
 Crispens, C. G., Jr., 4061.
 Crofts, J. M., 948.
 Cronkite, E. P., 1239.
 Crosby, W. H., 3555.
 Crosfill, M. L., 4171.
 Cross, R. F., 1026.
 Crowley, J. P., 3023.
 Cruickshank, C. N. D., 3904.
 Cruickshank, R., 2027.
 Csóka, R., 3888.
 Csontos, L., 3223.
 Cuckler, A. C., 2143, 4031.
 Culbertson, C. G., 3948.
 Culey, A. G., 2776.
 Cumming, R. B., 3916.
 Cunningham, C. H., 3450, page 562.
 Cunningham, I. J., 187.
 Cuomo, P., 1192.
 Cuperlović, K., 4049.
 Cuperstein, R., 2286.
 Curto, G., 3680.
 Cuthbertson, D. P., 4168.
 Cvetković, L., 3654, 3661.
 Cygankiewicz, M., 66.
 Czernicki, B., 345, 2088.
 Czub, E., 4107.
 Dämmrich, K., 895, 2313.
 Dafaala, E. N., 24.
 Dahl, L. K., 500.
 Dahlqvist, A., 2336.
 Dahm, P. A., 3063.
 Dahme, E., 165, 902.
 Dai, N., 757.
 Dalarno, A. C., 3038.
 Dallenbach, F., 2499.
 Dalton, R. G., 1017, 3082.
 Dam, A., 42.
 Dammers, J., 2589.
 Damon, R. A., 3339.
 Dane, D. S., 3996.
 Dănescu, A., 3133.
 Daniels, J. B., 3234.
 Danov, D., 284.
 Danterman, W. C., 1841.
 Darbyshire, J. H., 2534, 2539.
 Darcel, C. le Q., 461, 1198, 1199, 1302, 1889, 2182, 2730.
 Dardiri, A. H., 2203, 2572.
 Dargelos, R., 3940.
 Darlington, C. D., 102.
 Das, K. M., 2983.
 Dasinger, B. L., 3519.
 Davenport, F. M., 2169.
 Davey, L. A., 975.
 David, J. E., 4117.
 Davidson, A. G. F., 4182.
 Davidson, I., 981, 2796.
 Davidson, J. G., 2382.
 Davidson, M., 1424.
 Davies, D. R., 4132.
 Davies, M. C., 2204.
 Davies, M. E., 3192.
 Davies, R. E., 188, 1907.
 Davies, T., 2659.
 Davis, A. D., 1119, 3244.
 Davis, B. B., 259.
 Davis, C. J., 1846.
 Davis, E. A., 2440.
 Davis, G. K., 3018, 3081, 3344, 3382.
 Davis, J. G., 2368.
 Davis, J. W., 2805.
 Davis, J. W. C., 1651.
 Davis, L. L., 3106.
 Davis, M. E., 1574.
 Davis, M. S., 1357.
 Davis, R. A., 3787.
 Davis, R. E., 1902.
 Davis, S. P., 576.
 Davletova, L. V., 547.
 Davydov, N. N., 3517.
 Dawes, B., 2934.
 Dawes, G. S., 1962.
 Dawson, D. J., 3750.
 Dawson, F. L. M., 2009, 3426, 4200.
 Dawson, J. R., 3442.
 Day, E. J., 3317.
 Day, P. L., 1908.
 De, S. K., 2670.
 Deamer, D. W., 2365.
 Dean, D. J., 2949.
 DeArmon, I. A., Jr., 2806.
 Dedić, K., 9.
 DeEds, F., 466.
 Deegen, L., 380, 2429, 3865.
 Deetvarev, V. I., 1383.
 Dehmel, H., 1398, 3529.
 Dehority, B. A., 3014.
 Deichmiller, M. P., 1834.
 Dekeyser, J., 2884.
 Dekeyser, P., 670.
 Dekeyser, P. J., 739, 1471.
 Dekker, N. D. M., 2270.
 Dekking, F., 1146.
 Delak, M., 2331.
 DeLauney, G., 621.
 Delcambe, L., 2884.
 Dellì Quadri, C. A., 1575.
 Dellmann H.-D., 4172.
 DeLong, R., 3999.
 Demaux, G., 3684.
 Dement'ev, I. L., 3707, 3708.
 Demma, I., 1497.
 Denhardt, D. T., 458.
 Denington, E. M., 927.
 Denton, D. A., 1210, 3699.
 Denton, J. F., 2469.
 Denz, F. A., 1948.
 Depoux, R., 443, 2170.
 Derbyshire, J. B., 8, 2798, 2799.
 Derrick, E. H., 3630.
 Desai, R. N., 3418.
 Deschiens, R., 3299.
 Desmonts, G., 91, 2498.
 Desowitz, R. S., 86, 1077, 2135.
 Desrotour, J., 366.
 DeTray, D. E., 769, 2185, 2541.
 Deutsch, K., 1197.
 DeValois, D. G., 967.
 DeVolt, H. M., 1824.
 Devos, A., 642, 1350, 3369.
 Devyatova, A. P., 3468.
 Dewey, M. E., 983.
 Dewhurst, L. W., 818, 1852.
 Deyoe, C. W., 188, 1907.
 Dhandu, M. R., 1136, 1500, 2431.
 Dhennin, L., 723, 1784.
 Dhindsa, D. S., 736.
 Diaconescu, A., 3862.
 Diallo, M. S., 1406.
 Diamond, D. L., 4036.
 Diamond, L. S., 824.
 Dias da Silva, W., 4051.
 Diaz, L., 3496.
 Dible, J. H., 1055.
 Dick, A. T., 2710.
 Dick, E. C., 414.
 Dick, G. W. A., 3996.
 Dickel, H., 1723, 3139.
 Dickerson, J. W. T., 1555.
 Dickey, R., 266.
 Dickinson, D. A., 194.
 Dicks, M. W., 3014.
 Dickson, W. M., 1175.
 Dienst, R. B., 2900.
 Diernhofer, K., 1371.
 Digeon, M., 49.
 van Dijk, J. B., 2288.
 Dikshit, M. B., 531.
 Van Dilla, M. A., 2750.
 Dimitrov, G., 3308.
 Dimopoulos, G. T., 94, 1779.
 Dinculescu, P., 3227, 3228.
 Dineen, J. K., 2223, 3273, 3276.
 Dineen, P., 304, 985, 2801, 3461.
 Dinning, J. S., 1908.
 Dinter, Z., 422, 423, 2178.
 Dिल्lock, A. T., 2676, 3703.
 Dishnica, G., 3629.
 Dissanaikie, A. S., 2240.
 Ditchfield, J., 2463, 3194.
 Dixon, F. J., 1834.
 Dixon, J. M. S., 2842, 3873.
 Dmochowski, L., 2654.
 Dober, M., 2549.
 Dobrynina, A. Y., 1649.
 Dobson, C., 3900.
 Dobson, R. C., 3289.
 Dodd, D. C., 239, 649, 1176, 1203, 1949.
 Döbereiner, J., 4124, 4125, 4126.
 Döetsch, R. N., 2482.
 Dohotaru, V., 2907.
 Dolan, M. M., 3905.
 Doll, E. R., 2168.
 Dollahite, J. W., 1252.
 Dolowy, W. C., 1958.
 Donald, L. G., 4077.
 Donaldson, L. E., 962.
 Donnelly, J., 4005.
 Donker-Voet, J., 3173, 3193.
 Donnelly, R. B., 2379.
 Doran, D. J., 3929, 3930.
 Dordević, M., 3476.
 Dormer, B. A., 3548.
 Dorn, P., 264, 3561.
 Dorney, R. S., 1867.
 Dorobantu, R., 1007.
 Dorough, H. W., 1992.
 Dorsman, W., 805.
 van Dorsen, C. A., 53, 2082, 2840, 3193.
 Doty, L. T., 3319.
 Dougherty, E. Jr., 748.
 Douglas, S. W., 2199.
 Douglas, S. D., 1271.
 Douglas, S. W., 4097.
 Douglass, C. D., 2273.
 Douthwaite, A. H., 535.
 Douvres, F. W., 824, 1858.
 Dow, C., 1300, 4037.
 Eddy, G. W., 2595, 3288.
 Edebo, L., 2080, 2081.
 Edgar, D. G., 2006.
 Edgar, S. A., 1699.
 Edmondson, J., 2707.
 Edson, E. F., 916.
 Edward, D. G. Jr., 689, 1413.
 Edwards, B. L., 1088, 3720.
 Edwards, H. M., Jr., 2277, 2278.
 Edwards, M. J., 1464.
 Edwin, E. E., 2676, 3703.
 Effenberger, E., 3072.
 Egan, A. N., 1463.
 Egerton, J. R., 4038.
 Eghici, C., 631, 988.
 Dragonas, P. N., 1719.
 Drăgușin, A., 1159.
 Drake, J. W., 3623.
 Drapalyuk, E. I., 1395.
 Draper, H. H., 254.
 Drapiewski, V. A., 2969.
 Drazan, J., 2548.
 Dreizen, J. G., 3836.
 Dreizen, S., 3336.
 Drescher, J., 3952.
 Drewniak, E. E., 3106.
 Drieux, H., 3042.
 van Drimmelen, G. C., 3170, 3883.
 Driscoll, T. B., 3706.
 Drobeck, H. P., 910.
 Drouhet, E., 3195.
 Drozdov, G. G., 1509.
 Druce, C. G., 4162, 4195.
 Druce, R. G., 2073.
 Dudge, J. H., 1860, 4028, 4029, 4030, 4035.
 Drummond, R. O., 143, 801, 1840, 4007.
 Drury, A. R., 3392.
 Drysdale, A. D., 3358.
 Dyalde Perez, V., 3294.
 Dubos, R. J., 2118, 3854.
 Dubose, R. T., 789.
 Dubost, P., 860.
 Ducker, D. J., 2252.
 Dudgeon, J., 8994.
 Düwel, D., 466, 807, 810.
 Duff, J. T., 3897.
 van Duijn, C. Jr., 1630.
 Dukelow, W. R., 945.
 Dukles, P. P., 3763.
 Dumith Arteaga, G., 3207, 3607.
 Dumitrescu, A., 1019.
 Dumonteil, C., 1877.
 Dun, R. B., 1292, 1304, 4191.
 Duncan, C. S., 2711.
 Duncan, D. L., 1316.
 Dungworth, D. L., 40, 3200.
 Duniewicz, M., 2854.
 Dunlap, J. S., 1175.
 Dunlop, R. H., 2346.
 Dunn, A. M., 3653.
 Dunne, H. W., 3250, 3599, 3891, 4050.
 Dunsford, L., 3272.
 Durand, J., 358.
 Durand, M., 3722.
 Durdević, R., 2323.
 Duret, J., 2485.
 Dushniku, N., 3629.
 Dussardier, M., 3777.
 Dutcher, R. M., 793.
 Duthie, I. F., 582.
 Van Duyn, C. M., 1965.
 Dvořák, M., 1258, 2219.
 Dyadechko, V. N., 1158.
 Dval, R. S., 1154.
 Dymov, E. F., 1564.
 Dymowska, Z., 2452.
 Dynna, O., 1562.
 Eames, L. N., 2867.
 Eaton, H. D., 3014.
 Ebi, Y., 28.
 Ebner, F. F., 778.
 Ebner, K. E., 2885.
 van Eck, G., 1865.
 Eckell, O. A., 3829.
 Eckert, J., 162, 825.
 L'Ecuyer, O., 2191.
 Eddy, G. W., 2595, 3288.
 Edebo, L., 2080, 2081.
 Edgar, D. G., 2006.
 Edgar, S. A., 1699.
 Edmondson, J., 2707.
 Edson, E. F., 916.
 Edward, D. G. Jr., 689, 1413.
 Edwards, B. L., 1088, 3720.
 Edwards, H. M., Jr., 2277, 2278.
 Edwards, M. J., 1464.
 Edwin, E. E., 2676, 3703.
 Effenberger, E., 3072.
 Egan, A. N., 1463.
 Egerton, J. R., 4038.

- Eggert, M. J., 1060.
 Egoshin, I. S., 2853.
 Egyed, M., 3326, 4121.
 Ehrlich, I., 2609.
 Eibl, K., 2381.
 Eiland, E., 2115.
 van der Eijk, W., 3376.
 Eikmeier, H., 2234.
 Eisma, W. A., 2180.
 Eisner, H. J., 920.
 Eklund, C. M., 749.
 Ekstedt, R. D., 608, 1678.
 Elam, C. J., 1202.
 Elam, G., 4028, 4029, 4030, 4035.
 Elam, G. W., 1860.
 Elberg, S. S., 3884.
 Elder, C., 123, 2851.
 Elder, H. A., 3562.
 Elek, P., 3913.
 Elliot, J., 1275, 3773.
 Elliott, A. Y., 1825.
 Elliott, G. A., 659.
 Elliott, R. T., 755.
 Ellis, E. M., 3533.
 Ellis, F. B., 2747.
 Ellis, P. A., 3560.
 Ellis, S. E., 866.
 Ellis, W. W., 1250.
 Ellner, P. D., 3895.
 El-Nassari, B. B., 3612.
 Elson, K., 2073.
 Elwell, L., 3147.
 Embleton, D. P. F., 1332.
 Embrey, M. P., 3390.
 Emby, G. N., 4017.
 Emdin, R., 215.
 Emmens, C. W., 2000.
 Emmens, C. W., 3550.
 Emro, J. E., 4044.
 Enchev, S., 369.
 Ender, F., 1562.
 Endo, M., 2579.
 Engbaek, H. C., 1685.
 Engel, K., 794.
 Engel, W. K., 3733.
 Engelbrecht, H. J., 4047.
 Englehard, W. E., 3247.
 Engeler, H. K., 518, 1763, 2024, 2048.
 Englert, M. E., 2204.
 English, M. P., 3542.
 English, P. B., 463, 1956, 2463.
 Enick, K., 162, 466, 807, 810.
 Enke, K.-H., 3673.
 Enneker, C., 295.
 Ensink, J., 3738.
 Ensminger, M. E., 1285, 3422.
 Entel, H. J., 340, 646, 1370, 2092.
 Enzle, F. D., 151, 1853, 1854, 1855, 2646, 3003.
 Epps, N. A., 2471.
 Eppson, H. F., 1250.
 Epstein, S., 2526, 2699.
 Epstein, S. S., 976.
 Erasmus, J., 89.
 Erb, R. E., 2372.
 Ercegovac, D., 1789, 2512.
 Erdman, I. E., 2877.
 Ereemeev, M. N., 3146.
 Erhardová, B., 2611.
 Erhardt, V., 4067.
 Eriksson, E., 1390.
 Erlandson, A. L., Jr., 3493.
 Ernek, E., 3246.
 Ernst, M. R., 3059.
 Ershov, V. S., 1878, 3831, page 502.
 Erwin, E. S., 175.
 Eshiet, N. E., 1285.
 Espersen, G., 1242, 2687, 2688.
 Espmark, J. A., 3605.
 Essler, W. O., 2345, 3078.
 Estergreen, V. L., Jr., 3416.
 Esteres, M. B., 720.
 Estill, L., 934.
 Euzéby, J., 1530, 2402, 3657, page 502.
 Evans, C. A., 776, 777.
 Evans, C. B., 2982.
 Evans, I. A., 4120.
 Evans, J. V., 2728, 2729.
 Evans, J. W., 3734.
 Evans, S. A., 3240.
 Evans, W. C., 4120.
 Eveland, W. C., 2065.
 Eveleth, D. F., 329.
 Evered, D. F., 2671.
 Everett, G., 2967.
 Evplov, N. N., 386.
 Ewert, A., 1170.
 Ewing, S. A., 1867, 3312.
 Ewing, W. H., 45, 2437.
 Eyles, D. E., 3562.
 Ezhova, O. I., 538.
 Fabian, G., 3423.
 Fabricant, J., 2479.
 Faddeev, L. A., 1577.
 Fagan, V. J., 3016.
 Fagard, P., 674.
 Fair, J. F., 3833.
 Fairchild, M. L., 3063.
 Falcoff, E., 2525.
 Falconer, I. R., 2358.
 Falke, D., 411.
 Fallon, G. R., 948, 949.
 Fangaut, R., 2322.
 Faninger, A., 3377.
 Fankhauser, R., 512, 3732.
 Farina, R., 1739.
 Farleigh, E. A., 4076.
 Farley, J. O., 1786.
 Farmer, G. R., 2750.
 Farr, M. M., 1772, 3929, 3930.
 Farrell, R. K., 882.
 Farrelly, B. T., 2755.
 Farrington, K. J., 3385.
 Fassel, H., 2268.
 Fattal, A. R., 3541.
 Faulkner, D. E., 2306.
 Favati, V., 3311, 3316.
 Favre, S., 3224.
 Faye, P., 1072.
 Feagan, J. T., 3750.
 Fearn, J. T., 4074.
 Fechner, J., 2944.
 Federwisch, G., 3545.
 Férida, M., 728, 729, 1439, 2506.
 Fegley, H. C., 970, 972.
 Peklistov, M. N., 2274.
 Feldman, I. I., 3039.
 Fell, B. F., 1975.
 Fellner, F., 905.
 Fendrick, A. J., 3905.
 Fenje, P., 408, 1103.
 Fenger, F., 1106, 1817.
 Fenger, H., 146.
 Fennestad, K. L., 2453.
 Feoktistov, P. N., 1411.
 Fergus, C. L., 3549.
 Ferguson, D. L., 1422.
 Ferguson, G. S., 1720.
 Ferguson, L. C., 2867.
 Ferguson, T. M., 1232, 4100.
 Fernandes, M. V., 2915.
 Fernandez González, J., 2895.
 Fernelius, A. L., 2806.
 Ferrando, R., 859, 2679, 4169.
 Ferrebee, J. W., 2297.
 Ferreira de Abreu, E., 57.
 Ferris, D. H., 3140, 3524.
 Ferris, R. D., 1117, 2925.
 Fertig, S. N., 1989, 1990.
 Fesce, A., 987.
 Festenstein, H., 2222.
 Feteanu, A., 1488.
 Fickel, S., 3033.
 Field, A. C., 1171, 1987, 3690.
 Field, C. M. B., 3996.
 Fiennes, R. N. T.-W., 1215.
 Filsell, O. H., 878, 879, 4086.
 Fina, L. R., 1610, 3328.
 Findlay, J. D., 926, 2334.
 Fine, J., 1351, 1352.
 Fineg, J., 4203.
 Finegold, S. M., 2803.
 Finelli, R., 2359.
 Finkelstein, R. A., 2955.
 Finland, M., 3462.
 Firinghammer, B. D., 3191.
 First, N. L., 3095.
 Fischer, H., 577.
 Fischer, J. B., 2468.
 Fischer, K. P., 1484.
 Fisher, E. W., 1017, 3073, 3082.
 Fisher, M. W., 3493.
 Fisher, R. B., 876, 2720.
 Fisher, S., 606.
 Fite, G. L., 792.
 Fitzgerald, P. R., 833, 2139.
 Fitzpatrick, R. J., 3070.
 Fitzsimmons, W. M., 163, 1868, 2987.
 Flatla, J. L., 2020.
 Fleck, D. G., 3567.
 Flogmatov, N. A., 3098.
 Fleming, J., 175.
 Fleming, L. W., 1819.
 Flewett, T. H., 1508.
 Flick, D. F., 2273.
 Flock, M. A., 3397.
 Florence, R., 4206.
 Florey, H. W., 1925.
 Flowers, A. I., 789.
 Flückiger, U., 532, 740.
 Flux, D. S., 1571.
 Fodor, T., 318.
 Fodenby, E. G., 394.
 Foggie, A., 2888.
 Fojtáček, Z., 3698.
 Foley, C. W., 3807.
 Folk, G. E., Jr., 2345, 3078.
 Folkers, C., 3210.
 Folkes, B. F., 1315.
 Folley, S. J., 877.
 Folman, Y., 3793.
 Folse, D. E., 2627.
 Foltin, E., 3547.
 Fomina, A. Y., 619, 1411.
 Fomina, N. V., 1611.
 Fontaine, 2025.
 Fontaine, J., 724, 730.
 Fontaine, M., 431, 773, 843, 898, 1129, 1489, 1951.
 Fontaine, M. P., 898, 1489.
 Fontanelli, E., 398.
 Fontes, A. K., 1546, 1551, 1552, 1826.
 Forbes, G. B., 2745.
 Forbes, R. M., 4078.
 Ford, E. H. R., 4064.
 Ford, E. J. H., 1984.
 Forenbacher, S., 273, 1912, 2609.
 Fornazarić, M. R., 2581.
 Forrest, G. E., 3222.
 Forstner, M. J., 161.
 Forsyth, B. A., 1856.
 Fortushnyi, V. A., 538.
 Foster, J. R., 1508.
 Fougereau, M., 3217.
 Fouquet, G., 621.
 Fournier, J., 3042.
 Fowler, R. O., 3322.
 Fox, F. H., 1989, 1990.
 Fox, L. E., 1184, 2247.
 Fox, S., 2662.
 Fraga de Azevedo, J., 1382.
 Frajola, W. J., 2365.
 Francis, D. W., 641.
 Francis, J., 2775, 3851.
 Frank, A. H., 2421.
 Frank, E. D., 1851.
 Frank, N. A., 10, 2116, 2412, 2658.
 Frankel, J. W., 604.
 Franks, D., 4135.
 Franze, F., 2295.
 Franzke, H. J., 2038, page 235.
 Fraser, A., 1667, 3832, page 562.
 Fraser, A. F., 1305.
 Fraser, C. M., 2838.
 Fraser, D., 2622.
 Fraser, G., 1404, 2426.
 Fraser, R., 1280, 3702.
 Fratta, I., 3123.
 Frazier, L. M., 40.
 Frederick, E. C., 945.
 Freedman, H. H., 3835.
 Freeman, A. E., 3063.
 Freerksen, E., 1329, 2813.
 Freire de Faria, J., 487.
 French, E. L., 1123, 1463, 3569.
 French, F. E., 3283.
 French, J. E., 1925.
 Frens, A. M., 2589.
 Fried, K., 1690, 4053.
 Friedman, H., 1149.
 Friedman, L., 2581, 2882.
 Friedmann, J.-C., 1290, 1951.
 Frigerio, M. J., 3458.
 Frik, J. F., 3193.
 Fritsch, R., page 170.
 Fritsch, E., 17.
 Fritts, D. H., 156.
 Frittsch, W., 1947.
 Fritzsche, K., 1367, 1820.
 Froget, J., 4169.
 Fromunda, V., 1159.
 Frost, J. K., 2488.
 Froyd, G., 813, 4021.
 Fry, D. E., 2203, 2572.
 Fuchs, F., 767.
 Fuentes, M. R., 750.
 Fuentes, R. A., 96.
 Fuentes Marins, R. A., 3218.
 Füzi, M., 3888.
 Fuhrmann, H., 1844.
 Fujii, T., 277.
 Fujiki, M., 26.
 Fujimoto, Y., 3425.
 Fujita, J., 74, 149, 2233.
 Fujita, S., 2814.
 Fujita, T., 1216.
 Fukui, K., 1372.
 Fukui, M., 150.
 Fukui, R., 1372.
 Fulford, R. A., 3393.
 Fuller, R., 2131.
 Fulthorpe, A. J., 654.
 Funnell, H. S., 2316.
 Furniss, A. L., 3859.
 Furth, J., 900.
 Fussgänger, R., 1079.
 Gabel, A. A., 1284.
 Gaber, S., 2979.
 Gabrachansky, P., 515.
 Gabis, J., 1001.
 Gaby, W. I., 1149.
 Gästrin, B., 8.
 Gafni, M., 1728.
 Gagliardi, G., 2206, 3503, 3578, 3614.
 Gagliardi, L. A., 3493.
 Gagov, I., 1499.
 Gahne, B., 3804.
 Gaidano, R., 544, 1286.
 Gainer, J. H., 2941.
 Gala, R., 3857.
 Galati, P., 81, 2465, 2532.
 Galbraith, N. S., 2837, 3500.
 Galbraith, T. A., 1585.
 Gale, C., 2132, 2537, 2578, 2825, 3982.
 Gallagher, C. H., 1590, 3885, 3739, 4116.
 Gallagher, P. J., 4017.
 Gallivan, J. F., 8141.
 Gallo, G. G., 3329.
 Gallo, L., 2273.
 Gallo, P., 3199.
 Galton, M. M., 75, 1046, 1322.
 Galvin, T. J., 1178, 1179, 1180.
 Gamble, L. C., 2768.
 Gamčík, P., 1736, 2855.
 Ganong, W. F., 570.
 Ganter, P., 860.
 Gaon, J. A., 2583.
 Gapochko, K. G., 1399.
 Garbe, H. G., 395, 731, 1788.
 Garbers, G. V., 2531.
 Garbutt, E. W., 2053.
 Gardiner, A. C., 1223.
 Gardiner, E. B., 501.
 Gardiner, J. L., 1775, 3926.
 Gardiner, M. R., 2622, 2826, 3717, 4122.
 Gargani, G., 342.
 Garin, N. S., 1399.
 Garnham, P. C. C., 2136, 3939.
 Garner, R. J., 210, 1604, 1609, 1935, 1938, page 686.
 Garren, H. W., 3090, 3165.
 Garrod, L. P., 1953.
 Garside, J. S., 1288.
 Garzillo, M., 2143.
 Gáspár, N. Z., 3356.
 Gasparini, U., 300, 1241, 1682, 1683, 2040.
 Gassmann, B., 495, 4067.
 Gatterdam, P. E., 147.
 Gaud, J., 3296.

- Gaver, O. H., 932.
 Gavin, J. J., 604.
 Gavriets, E. S., 1414.
 Gavrilov, V. A., 405.
 Gazarkh, Z. S., 2817.
 Gazzinelli, G., 4051.
 Gdovin, T., 1735.
 Gdovinová, A., 2564.
 Geake, F. H., 545, 2740.
 Gebhardt, L. P., 1454.
 Gee, G. R., 1642.
 Gefen, N. E., 1399, 1835.
 Gehle, M. H., 3696.
 Geiringer, B., 3803.
 Geiss, E., 1098.
 Geissler, H., 3166.
 Gemmell, M. A., 2616, 3648, 3649.
 Gemmer, H., 1190.
 Gemzell, C. A., 283.
 Genther, C., 2145.
 Gentile, G., 1241, 1895.
 Gentles, J. C., 1662.
 Gentry, G. A., 754.
 Gentry, R. F., 684, 685.
 Genung, W. G., 145.
 George, J. T. A., 3136.
 George, L. A., 3404.
 Gereš, V., 1246.
 Gerhardt, P., 3947.
 Germanuyk, Y. L., 1265.
 Gerov, K., 1326.
 Gerriets, E., 495, 704, 4067.
 Gershoff, S. N., 3022.
 Getz, M. E., 3562.
 Geurden, L. M. G., 1350, 3369.
 Geyer, S., 224, 1758.
 Ghaffar, S. A., 1458.
 Gheorghiu, I., 3228.
 Ghitino, P., 286.
 Giacosa de Crescini, A. M., 100, 1102.
 Gianforte, E. M., 692.
 Gianturco, R., 3569.
 Gibor, A., 1654.
 Gibson, A. J. F., 1518.
 Gibson, C. L., 709.
 Gibson, T. E., 2995, 2997.
 Gierloff, B. C. H., 3197, 3571.
 Giesecke, D., 12.
 Gilbert, C. S., 1250.
 Gilbert, R. P., 3870.
 Gilbert, Y., 131, 450, 1116.
 Gilboa-Garber, N., 2590.
 Gili, G., 544, 1286.
 Gill, E., 2202, 2565.
 Gillem, H. C., 2074, 2075.
 Gillespie, J. G., 1130.
 Gillespie, J. H., 1465, 1481, 1812, 2981.
 Gillespie, R. W. H., 3886.
 Gills, W. T., 528.
 Gills, M., 2067.
 Gilly, C. L., 528.
 Gilman, H. L., 3890.
 Gilmore, V., 2263.
 Gilmour, D. G., 2224, 3272.
 Gilmour, N. J. L., 3861.
 van Gils, J. H. J., 3131.
 Gimeno, E. J., 3188.
 Ginanni, C., 817.
 Giola, V., 1753.
 Giolitti, G., 3877.
 Girard, A., 1491.
 Girard, M., 471, 773, 1129.
 Girard, O., 130, 2946.
 Girlando, M., 1672.
 Giotto, V., 3678, 3614.
 Glasp, C., 1740.
 Glaser, D. B., 968.
 Gitlin, D., 2879.
 Gitter, M., 3160.
 Di Giuseppe, F., 3666.
 Gladenko, I. N., 538, 3064.
 Glascock, R. F., 2280, 2389.
 Glawischning, E., 53.
 Glebova, I. Y., 1700.
 Gledhill, A. W., 3809.
 Glenchur, H., 1038, 2447.
 Glenn, M. W., 1250.
 Glick, B., 251, 2967.
 Glizorijević, J., 4049.
 Gliński, Z., 1137.
 Glovatskaya, M. G., 2110.
 Glover, T. D., 3097.
 Gloxhuber, C., 1166.
 Gmitter, J., 115.
 Goenenour, W. S., Jr., 2524.
 Godfrey, D. G., 1415.
 Godfrey, J. F., 634.
 Gobel, F., 578.
 Goedbloed, E., 715, 1085.
 Gönner, E., 1165, 1167.
 Görner, F., 1107.
 Goerttler, V., 624, 3487.
 Goetinck, P. F., 2021.
 Goetz, R. H., 932.
 Goffe, A. P., 1340.
 Gołaszewski, H., 3253.
 Golat, T., 2823.
 Golub, L., 917, 1259.
 Goldman, H. M., 973.
 Goldwasser, E., 3763.
 Gollop, J. B., 3235.
 Golosin, R. V., 2500.
 Golovatskii, I. D., 1266.
 Gonzales Stagnaro, C., 553.
 Good, A. L., 4144.
 Good, R. A., 1832.
 Goode, E. R., Jr., 2847, 3880.
 Goodhue, L. D., 1156.
 Gooding, C. D., 2563.
 Goodland, R. L., 1194.
 Goolden, A. W. G., 195.
 Gorbelt, R. V., 3707.
 Gordon, G. Y., 1835.
 Gordon, H. McL., 1540, 3307.
 Gordon, I., 9440.
 Gordon, J., 1932.
 Gordon, J. G., 3012.
 Gordon, N., 2363.
 Gordon, R. F., 1288, 3724.
 Gordon, R. S., 864.
 Goret, P., 131, 431, 450, 603, 773, 1129, 1489.
 Gorham, H. J., 882.
 Gorišek, J., 1390.
 Gorman, G. W., 1046.
 Gorrill, R. H., 1715.
 Gortsevskii, S. A., 360.
 Goryainova, Z. S., 2327.
 Gosh, K., 3124, 3125, 3126.
 Gossett, F. O., 693, 1767.
 Gosslee, D. G., 3014.
 Goswami, S. K., 2670.
 Gottschalk, C., 846.
 Goube de Laforest, P., 3325.
 Gouffon, Y., 450, 1116.
 Goupille, F., 41.
 Gourlay, R. N., 911, 8109.
 Govaerts, A., 439.
 Gowland, G., 662.
 Graber, M., 820, 2242, 2243, 3297.
 Grace, J. T., Jr., 4004.
 Gracey, J. F., 509, 1249, 1761, 2633.
 Gradess, M., 1886.
 Grässer, R., 2126.
 Graf, A., 311.
 Graham, E. F., 945.
 Graham, G. L., 971.
 Graham, I. C., 3908.
 Graham, J. M., 3748.
 Graham, N. McC., 1597.
 Graham-Jones, O., 1215, 3036.
 Graheer, H., 1432.
 Gramenzi, F., 3666.
 de Graña, A., 2656.
 Granett, P., 4013.
 Grant, C. A., 841, 1946.
 Gras, G., 820, 2243.
 Gras, J., 140.
 Gräsoin, G., 3133, 3134.
 Gratzl, E., 522, 782, 1379.
 Gray, A. R., 1418, 3556, 3921.
 Gray, M. L., 1346.
 Gray, W. J., 3292.
 Greaves, J. P., 2271.
 Green, C. R., 3746.
 Green, H. F., 1067.
 Green, J., 2676, 3703.
 Greenbaum, A. L., 877.
 Greenland, R., 2145.
 Greenwood, D. A., 3379.
 Grégoire, C., 1864, 2246.
 Grezob, B., 421.
 Gregorović, V., 2175.
 Gregory, B. R., 3335.
 Gregory, D. W., 2070.
 Greig, A. S., 1809, 2928, 2945, 3206, 3602.
 Greig, W. A., 1213.
 Grekova, N. A., 62.
 Grenan, M. M., 4101.
 Grešková, M., 1107, 3246.
 De Grest, A., 3406.
 Greul, H., 379, 494.
 Greuner, H.-E., 2069.
 Grewal, M. S., 696.
 Grice, H. C., 3194.
 Griem, W., 1433.
 Griesemer, R. A., 760.
 Griffen, W. O., 2364.
 Grinths, H. J., 882.
 Griffiths, M. E., 2701.
 Griffiths, T. W., 871.
 Grifo, A. P., Jr., 3014.
 van der Grint, J., 2589.
 Grigoriu, N., 3189.
 Grigoryan, M. S., 1237.
 Grillo Torrado, J. M., 100, 1102.
 Grimmer, P., 3019, 3341.
 Griner, L. A., 3185, 3186, 3187.
 Grinnell, E. H., 4119.
 Groblewski, S., 2666.
 Groenewald, J. W., 2233.
 Grogan, E. W., 3955.
 De Groodt, M., 1621.
 De Groot, B., 2759, 3421.
 Grosheva, G. A., 231, 233, 2944.
 Gross, L., page 502.
 Groth, W., 2323, 3751.
 Groulade, J., 1225.
 Groulade, P., 1091, 1225, 2498, 3042.
 Groupé, V., 1547.
 Groves, H. F., 3656.
 Groves, T. W., 2636.
 Gruber, R., 3129.
 Grubliauskas, L., 1486.
 Grüber, H.-D., 1468, 2177, 4087.
 Grütte, F.-K., 4067.
 Grumbles, L. C., 761, 789, 1015, 2829.
 Grummer, R. H., 1926.
 Grund, S., 25.
 Grunert, E., 2380.
 Gualandi, G., 375.
 Gualandi, G. L., 3558.
 Guarino, C., 3613.
 Guarda, F., 914, 2317.
 Güralp, N., 1528, 1531.
 Guercio, V., 1497, 3467.
 Guerrant, N. B., 1904.
 Gürtler, H., 1897.
 Gueslin, M., 1972.
 Guest, W., 4175.
 Guia, M. M., 4051.
 Guida, V. O., 349.
 Guillon, J., 669, 2242, 3297.
 Guillo, B., 91, 3211.
 Guillon, J. C., 787, 1707, 2543, 3492, 3669.
 Guillot, G., 636.
 Guindy, E., 2979.
 Guinée, P. A. M., 1023, 3498.
 Gulasekharam, J., 3505.
 van der Gulden, W. J. I., 1760, 3210.
 Gump, D., 3634.
 Gunsalus, I. C., 3826, page 432.
 Gupta, B. R., 348, 2835, 3502.
 Gupta, S. P., 2620.
 Gurd, M. R., 2390.
 Gurevitch, J., 2590.
 Gusev, B. A., 3162.
 Gusev, V. M., 135.
 Gutierrez, J., 1202.
 Gutman, A. B., 1978.
 Gylstorff, I., 173, 1224, 1911.
 Gyrisco, G. G., 1942, 1989, 1990.
 Hackbarth, J., 4123.
 Hackett, P. L., 1585, 3404.
 Hadani, A., 2146.
 Haggroth, S., 3372.
 Haenel, H., 495, 2384, 4067.
 Hafez, E. S. E., 1285, 1629, 3422.
 Haga, T., 655.
 Hageman, E. C., 2385.
 Hagemann, E., 596.
 Hagen, K. W., Jr., 2141, 3901.
 Hager, E. B., 2297.
 Hahn, P., 3400.
 Hahnefeld, E., 429.
 Hahnefeld, H., 429.
 Haig, D., 2529.
 Hajdú, S., 3169.
 Hajsig, M., 359.
 Hakin, S. A. E., 2709.
 Halasa, M., 3184.
 Halbert, S. P., 3465.
 Hale, H. H., 2804.
 Hale, O. M., 863.
 Hale, W. H., 4068.
 Halik, J., 996.
 Hall, R. J., 527.
 Hall, R. J., 2871.
 Hall, W. H., 1038, 2447.
 Hall, W. T. K., 707, 1520.
 Halliday, R., 1147, 1729, 1964.
 Halpin, P., 3381.
 Halstead, S. B., 3979.
 Hamilton, J., 2632.
 Hamlin, R. L., 2344.
 van der Hammen, H. J., 3062.
 Hammer, D., 2076.
 Hammond, D. M., 1422, 3925.
 Hammond, P. B., 1937.
 Hamon, Y., 41.
 Hamparian, V. V., 3961, 3962, 3963.
 Hampil, B., 3962.
 Hanaki, T., 1694.
 Hancock, J. L., 946, 4190.
 Handford, S. W., 1238.
 Handschumacher, R. E., 3683.
 Hanger, W. G., 1948.
 Hankin, L., 3683.
 Hanly, E. W., 4175.
 Hanly, S., 3437.
 Hanna, S., 3693.
 Hannan, J., 1554.
 Hansel, W., 287, 2014.
 Hansen, H.-J., 3043.
 Hansen, M. A., 2020.
 Hansen, M. F., 1852.
 Hansen, P. A., 2065, 2808.
 Hansens, E. J., 4013.
 Hanson, D. J., 4137.
 Hanson, L. E., 3524, 3526, 3623.
 Hanson, R. P., 2173.
 Hanus, E. J., 1909.
 Hanzal, L., 2611.
 Haraszti, J., 2376.
 Harding, J. D. J., 1088.
 Harding, W. B., 3956.
 Hardwick, B. C., 3351.
 Hardwick, D. C., 1966, 3403.
 Hare, J. H., 539.
 Hare, W. C. D., 3086.
 Harker, K. W., 911, 3109.
 Harmer, G. L. M., 2390.
 Harms, R. H., 2144.
 Harnach, R., 2190, 2555.
 Harold, L. C., 1261.
 Harper, M. J. K., 567, 3789.
 Harrari, H., 1701.
 Harris, A. H., 1003, 1244.
 Harris, A. N. A., 2770, 3956, 4076.
 Harrison, D. L., 1940.
 Harrison, H. N., 1278.
 Harrison, I. R., 2971, 4016.
 Harrison, J. L., 2868.
 Harrison, M., 1280, 3702.
 Harrison, P. M., 537.
 Harrop, A. E., 298.
 Hart, C. F., 1492.
 Hart, I. H., 79, 1398, 1754.
 Hart, J. A., 2969, 3952.
 Hart, P. C., 3353.
 Harthoorn, A. M., 3396.
 Hartley, G. S., 1993.
 Hartley, W. J., 2901.
 Hartmans, J., 3685.

- Hartwig, H., 25, 1691, 3230.
 Harvey, C. N., 1995.
 Harvey, K. A., 3998.
 Harvey, R. W. S., 2083.
 Harvey, T. L., 799.
 Harvey, W. R., 991.
 Hashimoto, H., 3433.
 Hashimoto, K., 54.
 Hasson, M., 4156.
 Hatch, C., 464.
 Hatemi, N., 4069.
 Hatzioles, B. C., 753, 2181, 2289.
 Haug, G., 3129.
 Hauke, H., 1325.
 Hauptman, B., 2380.
 Hauser, H., 1063.
 Hausler, W. J., Jr., 414.
 Havassy, I., 2761.
 Havel, R. J., 1965.
 Havez, R., 160.
 Havránek, I., 1107.
 Havre, G. N., 1562.
 Havrila, J., 1783.
 Hawbacker, J. A., 3687.
 Hawk, H. W., 1356, 2373.
 Hawker, L. E., 1315.
 Hawking, F., 468, 1078.
 Hawkins, W. B., 193.
 Hawkins, W. W., Jr., 156, 2259.
 Hay, A. J., 4179.
 Hay, C., 3328.
 Hay, D., 2185.
 Hay, J., 1039.
 Hay, M. F., 2013, 4176.
 Hayakawa, T., 1113.
 Hayashi, M., 204, 955.
 Hayashi, N., 121.
 Hayden, A. R., 1512, 3271.
 Hayman, B. I., 964.
 Hayman, R. H., 3755.
 Hays, V. W., 3631, 3687.
 Hazard, E. C., 983.
 Hazzard, D. G., 3014.
 Head, M. J., 8084.
 Healey, J. S., 1642.
 Healy, G. R., 2649.
 Heap, R. B., 953.
 Heath, G. B. S., 2992.
 Heath, I. D., 2350.
 Heath, K. R., 3133.
 Heaton, F. W., 3442.
 Hebel, H. F., 3546.
 Hebert, H. J., 3946.
 Hecht, G., 1166.
 Hecht, H. H., 2343.
 Hecke, F., 1438, 1807, 1808, 3968.
 Heddleston, K. L., 2434.
 van Heerden, C. J., 587.
 Heerlein, R., 578.
 Hegyeli, A., 3679.
 Heideman, M. J., 1599.
 Heidenreich, C. J., 3807.
 Heidrich, H. J., 533, 534, 4092.
 Heilman, D. H., 648.
 Heim de Balsac, H., 1784.
 Hein, W., 1722.
 Heinicke, W., 308.
 Heiniz, A., 1094.
 Heinke, L., 2113, 3716.
 Heinrich, S., 355.
 Heirman, A. L., 1042.
 Heist, C. E., 3891.
 Heje, N.-I., 1550.
 Héjli, L., 3223.
 Hejzlar, M., 2854.
 Hekimoglu, H., 1384, 1385.
 Heller, H., page 562.
 Heller, L. A., 1132.
 Hellerstein, E. E., 3692.
 Hellmann, E., 1722.
 Helmboldt, C. F., 747, 1505, 3008, 3014.
 Helmreich, R. L., 959.
 Helve, A. V., 3671.
 Hemingway, R. G., 2276, 3021.
 Hemmes, J. H., 793.
 Hemmings, W. A., 1729.
 Henderson, A. E., 964.
 Henderson, I. F., 2090.
 Henderson, J. A., 295.
 Henderson, W., 1026.
 Henderson, W. D., 2039.
 Henderson, W. M., 719, 721, 2154.
 Henle, W., 1502.
 Henneman, H. A., 8095, 4181.
 Henricson, B., 1282.
 Hensel, L., 2064.
 Henson, J. B., 761, 1015, 2829.
 Hentges, J. F., 950, 3081.
 Heptinstall, R. H., 1020.
 Herbert, I. V., 2486.
 Herin, R. A., 261, 1976.
 L'Héritier, M., 3195.
 Herlich, H., 2991.
 Hermodsson, S., 2178.
 Herrick, J. B., 3361.
 Hervy, A., 1972.
 Hess, A. D., 1796.
 Hess, W. R., 1095, 2541.
 Hesse, A. L., 1958.
 Hesse, N. C. W., 2288.
 Heude, B., 4169.
 Heuner, F., 2094, 3508, 3879.
 Heuschele, W. P., 3941.
 Heyneman, D., 4024.
 van Heyningen, W. E., 1391.
 Heywang, B. W., 1994.
 Hibbitt, K. G., 1910.
 Hibbs, J. W., 197.
 Hickey, J. L. S., 4063.
 Hiepe, T., 227, 1869, 2256, 3362.
 Hilbrich, P., 445.
 Hilding, A. C., 1279.
 Hill, C. H., 3017, 3090, 3165.
 Hill, C. R., 1236.
 Hill, D. W., 1454.
 Hill, E. G., 84.
 Hill, J. E., 3317.
 Hill, J. K., 3361.
 Hill, J. R., 3399.
 Hill, K. J., 1277.
 Hill, K., 3038.
 Hille, G., 1823.
 Hilleman, M. R., 3961, 3962, 3963.
 Hilliger, H. G., 1887.
 Hillis, W. D., 3993.
 Hilpert, P., 3764.
 Hinshaw, L. B., 639, 3870.
 Hintinaus, J., 1120.
 Hinton, N. A., 984.
 Hiramune, T., 72, 74.
 Hiraata, A. A., 796.
 Hirato, K., 775, 2560.
 Hird, F. J. R., 201.
 Hironaka, R., 254.
 Hirsch, H. A., 3896.
 Hisatsune, K., 319.
 Hitchner, S. B., 788.
 Hietaquist, S.-O., 503.
 Hla, D. M., 2581.
 Hoag, W. G., 2253.
 Hobbs, B. C., 1288.
 Hobbs, W. B., 3848.
 Hohohm, C. O., 3221.
 Hohohm, K. O., 3220.
 Hodeman, S. F. J., 1492.
 Hoch, P., 2.
 Höglund, G., 3372.
 Hoeksema, T. D., 1303.
 Hoekstra, J., 2521, 3985.
 Hoekstra, W. G., 1926, 2626.
 Hörchner, F., 52.
 Hoerlein, A. R., 3592.
 Hoerlein, B. F., 583.
 Hoersch, T. M., 4181.
 Hörter, R., 661.
 Hofer, A., 532, 740.
 Hoffmann, G., 441.
 Hoffund, S., 1998.
 Hofmann, P., 52.
 Hofmeier, C. F. B., 2717, 4110.
 Hogreve, F., 3473.
 Hohlweg, W., 502.
 Hohner, L., 280.
 Holiovec, J., 1917.
 Holden, H. F., 2782.
 Holden, P., 1109.
 Holc, J., 1016, 1678.
 Holland, P., 4132.
 Holland, R. F., 1989, 1990.
 Hollister, C. J., 1045, 1380, 1381.
 Holló, F., 3116, page 432.
 Holm, H., 3043.
 Holm, L. W., 1270, 1965.
 Holme, T., 2080, 2081.
 Holmes, J. C., 2617.
 Holmes, J. R., 2574, 2686, 3621.
 Holmes, J. W. H., 3971.
 Holst, A. P., 1824.
 Holt, H. D., 1340.
 Holt, R. J., 537.
 Holtenius, P., 2305.
 Holz, J., 1778.
 Holzhaacker, E. L., 529.
 Hong-Fang Lee, 835.
 Honigberg, B. M., 2488, 3923.
 Honska, W. L., 3706.
 Hoogstraal, H., 2229, 2979.
 Hook, A. E., 969.
 Hook, E. W., 11.
 Hoorens, J., 892, 1898, 3254, 3365.
 Hooven, N. W., 3287.
 Hoover, C. R., 2385.
 Hopkins, D. E., 147.
 Hopkins, T. F., 1967.
 Hoppe, R., 3530.
 Horava, A., 485.
 Hore, D. E., 238.
 Horiuchi, T., 1553.
 Van Horn, H. H., Jr., 3015.
 Horne, R. W., 2577.
 Horrocks, D., 3758.
 Horsfall, W. R., 3639.
 van der Horst, C. J. G., 868.
 Horton, A. M., 3317.
 Horton, R. E., 4063.
 Horton-Smith, C., 702, 2489.
 Horvat, J., 2111.
 Horváth, G., 2004.
 Horváth, I., 571, 3675.
 Horváth, Z., 558, 3736.
 Hosein, E. A., 1941.
 Hosik, A. F., 2251.
 Hosoda, T., 1151.
 Hosoya, T., 2705.
 Hotchin, J., 3609.
 Hou, C. T., 4109.
 Hovell, G. J. R., 4190.
 Hovorka, J., 1527, 4054.
 Howard, B. H., 92.
 Howard, D. A., 4072.
 Howard, D. H., 648.
 Howard, E. M., 1952.
 Howard, J. G., 3876.
 Howarth, J. A., 40, 1121, 1122.
 Howe, C., 1108.
 Howell, D. G., 2192, 2948.
 Howell, P. G., 1473, 3239.
 Howells, H., 2747.
 Howes, J. K., 950, 3081.
 Hoyt, H. H., 1050, 1057.
 Hoyte, H. M. D., 2491, 3295.
 Hreznko, J., 1419.
 Hrsović, N., 351.
 Hruška, K., 331.
 Hsiao May Wu, 1620.
 Hubbard, E. D., 4039.
 Huber, D. A., 3289.
 Hubrig, T., 3487, 3491.
 Huck, R. A., 2584, 2950, 3957.
 Huckle, W. E., 2354.
 Huddart, J. E., 1409.
 Huddleston, I. F., 3173.
 Huddleston, E. W., 1942, 1989, 1990.
 Hübner, K., 2812.
 Hübner, R. A., 3059.
 Hübner, R. J., 2926, 3592.
 Hüely, E., 809.
 Huffman, M. N., 4119.
 Hughes, C., 935.
 Hughes, A. M., 2906.
 Hughes, C. A., 809.
 Hughes, D. E., 2364.
 Hughes, D. L., 6.
 Hughes, H. V., 1400.
 Hughes, J. P., 181, 2885.
 Huismann, J., 3497.
 Huitema, H., 316.
 Hull, J. L., 2777.
 Hulland, T. J., 2497, 4022.
 Hulse, E. V., 2660.
 Hulstren, W., 215.
 Hummer, W. K., 989.
 Humphrey, G. L., 3949.
 Humphreys, D. A., 4120.
 Hunsaker, W. G., 3111.
 Hunt, G. R., 1168.
 Hunt, L. M., 143.
 Hunter, G., 219.
 Hunter, G. L., 4193.
 Huq, M.-M., 716.
 Hurlbut, H. S., 1112.
 Hurst, E. W., 3900.
 Hurst, L., 1593.
 Hurwitz, S., 3019, 3341.
 Hussey, C. V., 2725.
 Huston, T. M., 3107.
 Hutchinson, J. S. M., 289.
 Hutchinson, J. A., 3194.
 Hutchinson, W. F., 1534.
 Hutt, F. B., 3164.
 Huygelen, C., 111, 113, 739, 1471, 3580.
 Hwang, J., 747.
 Hyde, J., 451.
 Hymas, T. A., 907, 1776.
 Ibrahim, K., 3612.
 Ibrischimoff, N., 853.
 Ichihara, T., 2516.
 Ickowicz, M., 1728.
 Ide, Y., 3163.
 Ihlengburg, H., 305, 743.
 Iizuka, M., 182, 3730.
 Ikeda, M., 88.
 Ikeda, S., 3966, 3967.
 Ikegami, T., 1134.
 Iles, R. D., 3016.
 Ilijas, B., 2331.
 Il'in, V. G., 3051.
 Illés, J., 993.
 Illing, K., 1262.
 Imai, A., 2416.
 Imai, N., 2125.
 Imaizumi, K., 2416.
 Imbabi, S., 24.
 Imah, P., 3710.
 Impi Aho, 1281.
 Ingleton, J. W., 2387.
 Inglis, J. S. S., 1017, 2276.
 Ingram, D. L., 2334, 4145.
 Ingram, P. L., 1017.
 Ingram, R. L., 2899.
 Innes, J. R. M., 2703.
 Inoue, K., 1216.
 Inoue, M., 1906.
 Inui, S., 63.
 Inukai, Y., 655.
 Ionescu, A., 4019, 4098.
 Ionescu, G., 234.
 Ionov, P. S., 1200, 2326.
 Ireland, H. R., 4008.
 Irfan, M., 24, 3674.
 Irwin, D. H. G., 3817.
 Irving, E. A., 3093.
 Isaacs, A., 791, 3626, 3992.
 Isaenko, L. V., 1366.
 Istein, R. S., 2991.
 Iseri, O. A., 3742.
 Ishihara, K., 2604.
 Isaacs, A., 3992.
 Ishii, S., 72, 74, 1089.
 Ishikawa, T., 3425.
 Ishitani, R., 677, 1127, 1553.
 Ishizaki, R., 2526.
 Isopescu, I., 3133, 3134.
 Israil, M., 37.
 Itabashi, T., 183.
 Itard, J., 366.
 Itikawa, O., 520, 751, 1113, 1233.
 Ito, A., 1706, 3337.
 Ito, M., 122.
 Ito, S., 2416.
 Ivanov, A. D., 735.
 Ivanov, G. V., 3354.
 Ivanov, V. P., 1228.
 Ivanski, E. F., 1582.
 Ivens, M. S., 673, 3906.
 Ivey, M. C., 2752, 3291.
 Iwan, L. G. R., 802.
 Iwata, A., 2455.
 Iyer, C. G. S., 780.
 Iyer, P. K. R., 2986.
 Izawa, H., 122, 451.
 Izquierdo, I., 263.
 Izzi, R., 3501, 3615.
 Jabara, A. G., 488, 1884.
 Jackson, J. B., 143.
 Jackson, J. W., 33.

- Jacob, K., 1721, 3172.
 Jacob, W. K., 2002.
 Jacobs, L., 3212.
 Jacobs, R. E., 2476, 3554.
 Jacobson, D. R., 371, 854.
 Jacobson, N. L., 855.
 Jacotot, H., 61, 78, 2543, 2544.
 Jacquier, C., 2258.
 Jacquot, R., 3828, page 300.
 Jadin, J., 2582.
 Jaeger, R. F., 1738.
 Jaffe, P., 256, 3635.
 Jakovac, M., 359.
 Jakovljevic, D., 353.
 Jaksch, W., 493.
 James, O. W., 583.
 James, G. A., 3838.
 James, L., 3065.
 Jameson, J. E., 2079.
 Jamieson, P. P., 3622.
 Jamroz, C., page 686.
 Janeway, C. A., 2879.
 Janiak, T., 625.
 Janowska, I., 2513.
 Janowski, H., 29, 30, 120, 1695, 3253.
 Jansen, B. C., 1388, 2458.
 Jansen, J., 785, 786, 884, 3974, 3991.
 Jansen, J., Jr., 2619.
 Janssen, G. J. G. M., 2836.
 Jantošović, J., 1680, 1823, 4053.
 Jaroslow, B. N., 138.
 Jarrett, I. G., 878, 879, 4086.
 Jarrett, W. F. H., 822, 1183, 2996, 3658, 3957, 4037.
 Jarvis, C., 1668, page 235.
 Jasinska, S., 2880.
 Jay, G. E., Jr., 1930.
 Jeacock, M. K., 3355.
 Jean-Blain, M., 870, 1010.
 Jeannin, A., 3657.
 Jeganathan, P., 566.
 Jelfnek, V., 214.
 Jelfnková, V., 2308.
 Jellison, W. L., 3195, 3540.
 Jenkin, H. M., 2196.
 Jenkinson, D. McE., 926.
 Jennings, F. W., 822, 1183, 2996, 3658, 4037.
 Jennings, M. A., 1925.
 Jennings, R. C., 2662.
 Jennings, R. K., 1513.
 Jennings, W. L., 1442.
 Jennison, R. F., 1420.
 Jensen, A. H., 4186.
 Jensen, D., 901.
 Jensen, M. L., 3838.
 Jensen, R., 2107, 2878, 3701.
 Jentsch, K. D., 1344.
 Jerushalmy, Z., 3617.
 Jitaru, G., 1248, 3909.
 Jobse, A. S., 620.
 Joel, D. D., 1933.
 Jönsson, G., 2682.
 Jørgensen, S. K., 2683.
 Johannes, G., 2715.
 Johari, M. P., 555.
 Johnsen, R. E., 3063.
 Johnson, A. G., 1708.
 Johnson, C. A., 378.
 Johnson, C. R., 4154.
 Johnson, D., Jr., 909.
 Johnson, H. D., 245, 246, 556, 557.
 Johnson, H. N., 2914.
 Johnson, H. W., 2421.
 Johnson, J. E., Jr., 3124, 3125, 3126.
 Johnson, J. R., 4119.
 Johnson, M. L., 804.
 Johnson, P. C., 3706.
 Johnson, R. H., 855.
 Johnson, R. M., 281.
 Johnson, W. P., 1155.
 Johnston, M. M., 3843.
 Johnston, P. R., 3980.
 Johnston, R. P., Jr., 2348.
 Jolivet, G., 689.
 Jones, R. V., 1183, 2249.
 Jones, H. E. H., 2389.
 Jones, H. G., 210, 1604, 1935, 1938.
 Jones, L. H. P., 2338, 3771, 3772.
 Jones, L. M., 3753.
 Jordan, F. T. W., 923.
 Joubert, L., 603, 870, 1010, 2066, 2183.
 Joubert, S. M., 1594.
 Jovanović, M., 4049.
 Joven, L. L., 1635.
 Jowtscheff, E., 3484.
 Joyner, L. P., 703.
 Jubb, K. V., 480, 1799.
 Juhlin, I., 320.
 Jull, D. J., 3183.
 Julou, J., 860.
 Jumper, J. R., 709, 2899.
 Jungerman, P., 2413.
 Jungherr, E. L., 2403, page 300.
 Jungk, N., 2193.
 Jungmann, R., 158, 2254.
 Jungnitz, M., 3673.
 Juráček, V., 1535.
 Jurčina, A., 2540.
 Justice, W. H., 659, 1043.
 Juszkievicz, T., 3753.
 Kábrt, J., 2546.
 Kabuto, M., 3155.
 Kadyrov, G. K., 1268.
 Kaeberle, M. L., 3623.
 Kaemmerer, K., 4141.
 Kafel, S., 1482.
 Kagan, I. G., 2649.
 Kalgorodov, P. I., 3182.
 Kaiser, M. N., 2229, 2979.
 Kajiwaru, N., 3155.
 Kakulas, B. A., 3705.
 Kallfelz, F. A., 3094.
 Kamal, T. H., 246, 2301, 2302.
 Kamel, J., 1458, 3520.
 Kamel, S. H., 2234.
 Kamimura, T., 2125, 2579.
 Kamitsuka, P. S., 1455.
 Kampelmacher, E. H., 3498.
 Kampschmidt, R. F., 3535.
 Kanagawa, H., 3424, 3425.
 Kanai, K., 1328.
 Kanarek, A. D., 689.
 Kaneko, T., 1151.
 Kanoe, M., 2043.
 Kantor, S., 3928.
 Rao, T. T. H., 3388.
 Kaplan, A. S., 2160.
 Kaplan, H. M., 3869.
 Kaplan, M. A., 1513.
 Kaplan, M. M., 1886.
 Kaplan, W., 673, 2470, 3906.
 Karasek, E., 3745.
 Kardeván, A., 2861.
 Karg, H., 960.
 Karib, A. E., 3204.
 Karib, E. A., 3912.
 El Karib, E. A. A., 694.
 Karlović, M., 2050.
 Karlsson, K. A., 1583.
 Karr, M. R., 1857.
 Karsai, F., 904, 905, 4108.
 Karstad, L., 2173, 2951.
 Kartashov, P. A., 3050.
 Karzon, D. T., 1812.
 Kasbohm, C., 1885.
 Kashiwa, H. K., 1567.
 Kass, E. H., 2839.
 Kast, A., 893.
 Kastelic, J., 254.
 Kaszubkiewicz, C., 1747.
 Kataoka, T., 3229.
 Kates, K. C., 1853, 1854.
 Katić, I., 1689.
 Katić, R., 351.
 Katitch, R., 1749.
 Katitch, R. V., 1052.
 Katiyar, R. D., 2430.
 Kato, K., 3229, 3232.
 Katz, L. N., 1893.
 Katz, Y. J., 1270.
 Kauftmann, F., 47, 48, 1021.
 Kaufman, N., 2207, 2568.
 Kaufmann, R., 64.
 Kanter, F., 406, 1729, 2912.
 Kanter, D. A., 3147.
 Kawai, K., 2579.
 Kawakubo, A., 121.
 Kawashima, H., 1694.
 Kawata, K., 3425.
 Kay, D., 1041.
 Kay, R. N. B., 2673.
 Kayser, J., 1394.
 Kazakov, M. Y., 2824.
 Kazda, J., 3481.
 Keast, J. C., 2710.
 Keatinge, S. L., 3465.
 Keeble, S. A., 2948, 3611.
 Keech, H., 2865.
 Keech, H. L., 2864.
 Keeler, R. F., 3678.
 Keen, E. N., 852.
 Keidel, H. J. W., 1385.
 Kékesi, B., 2694.
 Kekwick, R. A., 1147.
 Keich, F., 1666, 4218, pages 106, 562.
 Kelentey, B., 1405.
 Keler-Bacoka, M., 273.
 Kellas, L. M., 4177.
 Kelley, D. C., 1069.
 Kelley, G. W., 2189, 2942.
 Kelley, G. W., Jr., 476, 2644.
 Kelley, R. B., 2036.
 Kells, H. R., 312.
 Kelly, A. L., 901.
 Kelly, D. F., 3969.
 Kelly, F. C., 1674.
 Kelly, R. G., 920.
 Kelly, W. R., 464.
 Kelsey, J. C., 2023.
 Kelsheimer, E. G., 145.
 Kelton, W. H., 685.
 Kemenes, F., 70, 2099, 2861.
 Kémény, A., 3356.
 Kemmerer, A. R., 1994.
 Kemp, J. G., 3111.
 Kemron, A., 2146.
 Kendrick, J. W., 3104.
 Kennedy, K. K., 3833.
 Kennedy, P. C., 40, 1121.
 Kennedy, R. C., 3585.
 Kenneth, J. D., 2039.
 Kennett, R. L., Jr., 3928.
 Kenny, G. E., 680.
 Kenny, J. E., 1174.
 Kent, L. H., 459.
 Kenzy, S. G., 3886.
 Keogh, B. P., 3785.
 Kerr, J. A. M., 2633.
 Kerr, W. R., 644, 1365.
 Kershaw, W. E., 1876, 4027.
 Kersjes, A. W., 921.
 Kersten, W., 893, 1922.
 Kertay, N., 318.
 Kesler, E. M., 2348.
 Kessel, R. W. I., 1730, 3171.
 Kessler, F. J., 235, 236.
 Ketler, A., 3961, 3962, 3963.
 Kevy, S. V., 2879.
 Keymer, I. E., 1403, 1495.
 De Keyser, J., 3543.
 Khachatryan, A. B., 427.
 Khairy, M., 1240.
 Khan, M. A., 461, 2596, 3386.
 Khanbegyan, R. A., 811.
 Kharina, N. P., 1030.
 Khatin, M. G., 1168.
 Khorava, G. V., 71, 2101.
 Khristov, S., 1326, 1480.
 Khundanov, L. E., 3468.
 Khun Shan-Ven, 651.
 Kibler, H. H., 244, 247, 1959.
 Kielwein, G., 1, 9.
 Kienel, G., 3067.
 Kienholz, M., 2812.
 Kifer, P. E., 2197.
 Kilbourne, E. D., 3233, 3951.
 Kilejian, A., 2615.
 Kilham, L., 3608.
 Kim, C., 413.
 Kimball, A. W., 900.
 Kimberg, D. V., 4165.
 King, A. S., 225.
 King, D., 2193.
 King, J. M., 1905.
 King, J. O. L., 852, page 686.
 King, N. B., 2537, 2858, 2825.
 Kingsbury, P. A., 2332, 4045.
 Kinnamon, K. E., 1877, 4055.
 Kintner, L. D., 2129.
 Kirillov, L. V., 314.
 Kirk, H., 2714.
 Kirkham, K. E., 2378.
 Kirschbaum, P., 263.
 Kirshnamurti, P. V., 3934.
 Kiser, J. S., 370, 688, 3071.
 Kiser, K. H., 774.
 Kishi, S., 2924.
 Kiss, I., 1405.
 Kiss, M., 3663.
 Kissling, R., 276.
 Kiszely, G., 571, 8675.
 Kita, E., 2455.
 Kitahara, Y., 2516.
 Kitchell, R. L., 2310, 2352.
 Kitts, W. D., 4128.
 Klastrop, O., 1675.
 Klatt, C.-H., 2841.
 Klaus, H., 3598.
 Kleeberg, H. H., 2423.
 Kleiber, M., 1963.
 Klein, F., 2806.
 Klein, M., 1506, 2538.
 Kleinkob, M. T., 1576.
 Kleinkob, Y. I., 616.
 Kleinschroth, E., 3129.
 Klepp, J.-L., 345, 2088.
 Klesmer, R., 3059.
 Klima, J., 782, 1801.
 Klimes, B., 1258, 1336, 3280.
 Kluge, E., 2918.
 Kmetz, E., 2875.
 Knezák, J., 1823, 4054.
 Kniazef, A. J., 2930, 3957.
 Kniwaldner, K., 153.
 Knight, G. J., 2130, 2472.
 Knocke, K.-W., 1469, 3242.
 Knorrp, J., 3855.
 Knowles, J. R., 1072.
 Knox, K. W., 1013, 2452.
 Knox, R., 536.
 Knudsen, E., 1618.
 Knudsen, O., 3427, 4198, 4199.
 Kobayashi, Y., 2125.
 Kobusiewicz, T., 1100.
 Koch, J. H., 2727.
 Koch, T., 2406, 2795, pages 52, 300.
 Koch, W., 3085.
 Kochanov, N. E., 1559.
 Kočíš, J., 2610.
 Kodicek, E., 873.
 Köhler, H., 453, 1657, 1768, 2312.
 Köhler, W., 3491.
 Köser, A., 2120.
 Koestner, A., 710, 1090, 2494.
 Kötsche, W., 3590.
 van Koetsveld, E. E., 1206, 3092.
 Koga, O., 1287.
 Kogan, Z. M., 2490.
 Kohane, J., 2286.
 Kohl, D., 1367.
 Kohler, P. H., 708, 2975.
 Kohn, A., 3617.
 Kojnok, J., 1790.
 Kokanović, R., 3179.
 Kokatnur, M. G., 192.
 Kokernot, R. H., 2918.
 Kokurichev, P. I., 3728.
 Koláček, M., 3698.
 Kolb, E., 629, 1897, 3521.
 Koldovský, O., 3400.
 Kolesov, A. M., 3707.
 Kolesov, S. B., 1836.
 Kolochine-Erger, B., 650, 1749, 1744.
 Kolumbić, T., 2111.
 Komárek, J., 171.
 Komarov, N. M., 564, 1997.
 Kon, S. K., 2791, page 300.
 Kóna, E., 2736.
 Konatí, I., 1074.
 Kondo, A., 2514, 2515.
 Kondos, A. O., 3741.
 Konermann, H., 2380.
 Konishi, S., 1134.
 Konno, K., 3860.
 Konno, S., 2921.
 Konst, H., 3479.
 Konstant, E. G., 344.
 Konstantinoff, A., 853.
 Konstantinoff, A., 1903, 1944.
 Kontrimavichus, L. M., 619.
 Kool, S. M., 793.
 Kopp, C., 2024.
 Koppel, Z., 420, 421, 1142, 2533.

- Korn, G., 429.
Kornysushenko, N. P., 1795.
Korolev, P. A., 844.
Korotich, A. S., 1366.
Korpássy, B., 4153.
Korthals, A., 2629.
Korych, B., 416.
Koslak, A., 943.
Kostansky, K., 1229, 2553.
Kostin, I. G., 1649.
Kostina, A. C., 1562.
Kostyra, J., 1186.
Kotera, S., 2579.
Kotlan, A., 592.
Kotov, S. S., 1578.
Kotrly, A., 2611.
Kotula, A. W., 3106.
Koudela, J., 2325.
Koutz, F. R., 3656.
Kovac, W., 2208.
Kovács, F., 2329.
Kovalenko, J. R., 1051.
Kovalenko, Y. R., 1411.
Kovalev, A. A., 2137.
Kowalczyk, T., 1926.
Kowalewski, H. V., 969.
Kowalski, E., 3727.
Kowalski, S., 1375.
Kozumplik, J., 2895.
Kožušník, Z., 1827.
Kradel, D. C., 4050.
Kradolfer, F., 3069.
Kraft, H., 1970, 3027.
Kraft, L. M., 3975.
Krakowiak, T., 1745.
Kral, F., 3198.
Kralj, M., 465, 514, 2174.
Kramer, M. F., 1979.
Kramer, T., 638, 3386.
Krasnikov, G. A., 2294.
Krassner, S. M., 705.
Kratsev, V., 2090.
Kratzer, F. H., 867.
Krause, W., 1262.
Krauss, H., 2064.
Krauss, S., 1695.
Kravets, I. K., 448.
Kréméry, V., 67, 3184.
Kreamer, A. E., 899.
Krehs, H., 507.
Kress, F., 1330.
Kresse, J. I., 1045, 1380, 1381.
Kretschmar, C., 3600.
Kristanoff, T., 853.
Krivoshta, E. E., 1859.
Krogh, N., 1560, 3682.
Kroll, H. T., 3057.
Kronberger, H., 838, 1881, 3320.
Kronfeld, D. S., 1963, 3357.
Kronthaler, O., 960.
Krous, D., 2644.
Krüger, G., 2846.
Krüger, W., 3167, 3509.
Kruize, J., 1865.
Krumbiegel, I., 2790.
Krutyporokh, F. I., 2007.
Krutzyk, P. H., 413.
Kuba, N., 3300.
Kubica, G. P., 3142.
Kubin, G., 1801, 3577.
Kučera, P., 335.
Kucharski, J., 4105.
Kucsera, G., 3144.
Kudélka, E., 1016.
Kühn, H., 1983.
Kuehne, R. W., 2524.
Kuida, H., 2343, 3870.
Kuil, H., 886.
Kuitert, L. C., 145.
Kujumgiev, I., 623.
Kulashiri, C., 2902.
Kul'sko, I. I., 426.
Kul'karni, V. B., 2443.
Kuma, N., 2514.
Kumagal, T., 3966, 3967.
Kumar, P., 460.
Kume, T., 54.
Kummerow, F. A., 192, 1906.
Kun'shige, T., 775, 2560.
Kuniyasu, C., 54.
Kunst, H., 785.
Kupfer, S., 1978.
Kurasova, V. V., 3548.
Kurbatov, T., 4161.
Kurelac, B., 2609.
Kurmanov, I. A., 364.
Kurnosov, K. M., 574.
Kurtz, H. J., 4102.
Kusano, N., 2579.
Kushner, H. F., 1649.
Kushnerov, T. N., 1742.
Kushnir, M. M., 3182.
Kusov, V. N., 1843.
Kutas, F., 3407, 4108.
Kuttler, K. L., 3389.
Kuwert, E., 99, 412, 1444, 1445, 3604.
Kuziela, T., 647.
Kvasnikov, A. K., 1920.
Kwapinski, J. B., 1407.
Labie, C., 843, 898, 3042.
Labouche, C., 174.
Lacassagne, L., 3781.
Lacaze, B., 2536.
Lackman, D. B., 3998.
Ladell, W. S. S., 3387.
Ladzińska, K., 3184.
Lämmier, G., 2335.
Lafenêtre, H., 1494, 2450, 3245.
Laffer, N. O., 1824.
de Laforest, P. G., 101.
Lafortune, J.-G., 3391.
Lagacé, A., 3350.
Lagasse, A., 1621.
Lagerlöf, B., 848, 849, 850.
Lagerlöf, N., 3808.
Lahiri, A., 323, 1320.
Lai, M., 1537.
Laing, J. A., 3190.
Laitha, L. G., page 686.
Lall, H. K., 59, 2849.
Lall, J. M., 2431.
Lambelin, G., 3293.
Lambert, G., 2847, 3880.
Lambert, H. P., 986, 1333.
Lambourne, L. J., 2765.
Lamensans, A., 3128.
Lamikhov, K. F., 1919, 3039.
Lamina, J., 1849.
Lamming, G. E., 569, 953.
Lamond, D. R., 952, 2765, 2766.
Lamont, P. H., 3969.
Lamotte, L. C., 1796.
Lamokin, G. H., 2176, 4072.
Lancaster, J. E., 2757.
Lancaster, J. L., Jr., 2597.
Lancaster, M., 4132.
Lancefield, R. C., 11.
Lancz, E., 3715.
Landau, M., 3480.
Landy, M., 1402, 3538.
Lane-Petter, W., 4219, page 562.
Lang, R., 724, 730, 765.
Lange, L., 1650.
Lange, R. L., 2343.
Langer, B., 797.
Langer, P. H., 3591.
Langford, E. V., 1199.
Lank, R. B., 4041.
Lannek, N., 191, 1218.
Lansade, P., 1125.
Lanz, E., 1913.
Lanzkowsky, P., 1293.
Lapage, G., 3273.
Lapin, B. A., 3723.
Laporte, A., 2536.
Larkin, P. J., 2978.
Laroche, M., 338, 1343, 2333.
Larsen, A. B., 622, 991, 2809.
Larsen, H. E., 472.
Larski, Z., 2545, 2554.
Larson, B. L., 2385.
Larson, C. L., 2982.
Larson, L. L., 2352.
Larson, N. L., 84.
Larvor, P., 2680, 4157.
Lascelles, A. K., 194.
Laschet, U., 502.
Lasley, J. F., 3807.
Lassiter, C. A., 857.
Lassmann, G., 1447.
Latham, W., 259.
Laties, V. G., 4148.
Lauber, J. K., 3778.
Lauerman, L., 2173.
Laufer, M. A., 2401, page 300.
Lauridsen, O., 1071.
Lauterbach, D., 1329, 2813.
Lautié, R., 18, 2442.
Lauwers, R., 670.
Lavender, A. R., 1281.
Lavigne, R., 146.
Lavrent'ev, P. A., 384.
Lavrentiades, G., 1254.
Law, G. R. J., 1656.
Lawrence, W. A., 1263.
Lawrie, R. A., 206.
Lawson, D. F., 1318, page 52.
Lax, T., 2550.
Layton, J. M., 2179.
Lazarevitch, M., 462.
Lazarov, E., 3308.
Lazuga, K., 2096.
Lazzaro, D. A., 2239.
Leach, T. M., 694, 2890.
Lear, S. A., 312.
Lease, E. J., 1902.
Lease, J. G., 1902.
Leat, W. M. F., 3704.
Leaver, D. D., 79, 1398, 1754.
Lebduška, J., 1872, 1874.
Lebeau, M. A., 2109.
Lebeda, M., 73, 2102, 2546.
Lebek, G., 3846.
Lebon, E., 1004.
Lecce, J. G., 659, 660, 3337, 3338.
Leclerc, J., 3216.
Lee, D., 1822.
Lee, D. H. K., 3805.
Lee, H. F., 4020.
Lee, J. H., 3886.
Lee, J. S., 2745.
Lee, R. P., 2989.
Lee, S. T., 122.
Leech, F. B., 1574, 3359.
Leek, R. G., 3931.
Lefrançois, C., 1972.
Leftheriotis, E., 724, 765, 2183.
Legantseva, V. I., 3726.
Legault-Démare, J., 1299.
Leger, P., 1220.
Legrand, P., 431, 1129.
Lehmann, C. F., 3473.
Lehmann, D. L., 1416.
Lehnert, C., 609, 1345.
Leibowitz, M. I., 4000.
Leistner, W., 1036.
Leland, S. E., Jr., 1860.
Lenahan, M. F., 452.
Lenets, I. A., 3354.
Lengemann, F. W., 1584.
Lenhart, C., 1828.
Lenk, V., 1709.
van Lennep, E. W., 4178.
Lennette, E. H., 1133, 2217.
Lennon, H. D., Jr., 937.
Lensch, J., 2760.
Leonard, E. P., 598.
Léonard, J., 2582.
Leont'ev, I. M., 1921.
Lerche, M., 1370, 1666, 4218, pages 106, 562.
Leroux, C., 3398.
Leroy, A. M., 3828, page 300.
Lesbounyries, G., 2264.
Lesser, E., 698.
Lestlie, I. W., 2058, 3844.
Lettow, E., 1885, 2313, 3797.
Leunen, J., 1437.
Leuthold, A., 2690.
Levaditi, J. C., 1091, 2498, 2543, 2544.
Lever, J. D., 3355.
Levine, N. D., 1081, 2139, page 686.
Levine, P. P., 89.
Levine, S., 2204.
Levinskas, G. T., 2318.
Levit, A. V., 1733.
Lévy, F. M., 3854.
Levy, G. A., 4179.
Lewis, A. L., 1442, 2912.
Lewis, C. W., Jr., 2419.
Lewis, D., 3089, 3119.
Lewis, E. F., 3117, page 432.
Lewis, G., 1213, 4113.
Lewis, K. H., 2749.
Lewis, R. T., 3110.
Libeau, J., 93.
Libich, M., 2586.
Libiková, H., 415.
Lidolph, A. A., 1806.
Liebermann, H., 2113, 3180, 3716.
Liebke, H., 327.
Liem, N. V., 757.
Lienert, E., 808.
Liess, B., 1468, 1469, 2177, 3242, 3957.
Lifshits-Vasil'chenko, A. A., 346.
Lilvak, M., 20.
Lilly, H. A., 924.
Lincoln, R. E., 2806.
Lindahl, I., 1853, 1854.
Lindberg, P., 191, 1218.
Lindblad, G., 741.
Linder, D., 2456, 2873.
Lindley, C. E., 2764.
Lindley, E. P., 2420.
Lindner, H., 1793.
Lindner, H. R., 2012, 4176.
Lindop, P. J., 2298, 4103.
Lindsay, D. B., 2677.
Lindsay, W. K., 1982.
Linnik, E. F., 2409.
Linton, A. H., 1315, 3546.
Linzell, J. L., 1602, 1966, 1968, 3403.
Lipton, M. M., 2587.
Lipton, S. H., 2324.
von Lipzig, J. H. H., 2836.
Lishman, A. W., 4193.
Lisk, D. J., 1942, 1989, 1990.
Lissot, M. G., 1141.
Litsky, W., 783.
Little, M. D., 2624, 4020.
Littlejohn, A. I., 1213, 2275, 3892.
Littlejohns, I. R., 3956, 4076.
Litvinov, N. A., 3202, 3914.
Litvisko, N. T., 2238.
Liu, P. V., 1696, 2823.
Live, I., 2089, 3834.
Livingstone, R. M., 4075.
Lober, P., 4059.
Lock, J. A., 3396.
Locke, L. N., 3583.
Lockhart, C. P., 4154.
Loddo, B., 1434, 2507.
Lodge, G. A., 1316, 2266.
Lodge, T., 3272.
Löflier, H.-C., 1931, 2827.
von Loen, A., 3688.
Lofgreen, G. P., 2777, 3695.
Lofland, H. B., 1892.
Loggins, P. E., 3081.
Lokhorst, W., 1960.
Lolin, M., 2494.
Lombard, C., 3010.
Lombardi, D., 3532, 3615.
Londrillo, A., 14.
Long, P. L., 2489.
Long, W. H., 4131.
Loomis, E. C., 2603.
Loosli, J. K., 1278, 3025.
Loppnow, H., 3668.
Lord, T. H., 858.
Lorenzutti, G., 2200.
Lorincz, A. E., 3806.
Lorvik, S., 3782.
Lotze, J. C., 3931.
Lovell, S. A., 2259, 2976, 3191, 3673.
Lovell, R., 1017, 2072.
Low, D. G., 2704.
Lowbury, E. J. L., 924.
Lowenthal, J. P., 3955.
Lown, B., 3692.
Loy, R. G., 3099, 3100.
Lozanić, B., 3645.
Lucam, F., 729, 1439.
Lucas, A., 838, 1343, 2333.
Lucas, A. M., 927, page 686.
Lucas, H., 3034.
Lucas, I. A. M., 4075.
Lucas, J. M. S., 2893.
Lucker, J. T., 826.
Ludwigsen, J., 3366.
Ludwig, E. H., 655.
Lühke, A., 435, 733, 2508, 3570.
Lüderitz, O., 47, 48, 1021.
Luecke, A. J., 3599.
Lueker, C. E., 2375, 3605.
Luginbühl, H., 512, 513.

- Luginbuhl, R. E., 747, 1505, 3268.
 Lukashenko, N. P., 1850.
 Lukashev, I. I., 517.
 Lunaas, T., 1636.
 Lund, E., 3568.
 Lundberg, A. M., 3889.
 Lundvall, R. L., 672.
 Lungu, V., 1159.
 Lupo, O., 1652.
 Luther, H. G., 4068.
 Lycke, E., 3568.
 Lyhs, L., 3676.
 Lyne, A. G., 1599, 2723, 2724, 3054.
 Lysek, H., 3662.
 Lysenko, I. P., 1837.
 Lysikowska, L., 647.
 Lyubashenko, S. Y., 651, 2103.
- Maag, D. D., 1211.
 van Maanen, P. H. A. M., 3193.
 Maas, A., 2919, 3485.
 Maas, H. J. L., 3092, 3371.
 McAleese, D. M., 4078.
 McAlister, J., 3996.
 McAllan, A., 4179.
 McAlpin, N. R., 156.
 McCabe, W. R., 3871.
 McCall, J. T., 1207, 3344.
 McCallum, E. S. R., 4077.
 McCance, R. A., 1555, 1556, 2284, 4084, 4069.
 McCarter, A., 3762.
 McCarthy, P. H., 1522, 1523, 1524, 4130.
 McCarthy, R. D., 505, 2348.
 McCartney, M. G., 3982.
 McCauley, A. B., 1909.
 McCay, C. M., 2300.
 McClaren, J., 1932.
 McCleery, E. F., 1533.
 McClellan, J. T., 2467.
 McClelland, L., 3962.
 McClenaghan, R. J., 1104.
 McClure, T. J., 1634, 3435.
 McClymont, G. L., 3741.
 McConachie, J. D., 3903.
 McConnell, D., 2365.
 McConnell, K. P., 899.
 McCoord, A., 2745.
 McCosker, P. J., 4151.
 McCreary, V. D., 1525.
 McCullum, F. O., 3620.
 McCune, R., 985, 3951.
 McDermid, M., 3272.
 McDiarmid, A., 519, 643.
 MacDonald, D. W., 2832.
 McDonald, I., 582, 3122, 4075.
 McDonald, I. R., 2360.
 McDonald, I. W., 1625.
 McDonald, J. R., 3620.
 McDonald, L. E., 3101.
 McDonald, M. F., 8430.
 McDonald, M. W., 4139.
 McDonough, E. S., 2467, 2469, 2470.
 McEntee, K., 2014, 3890.
 McEwan, T., 3747.
 MacFadden, D. L., 858.
 MacFarlane, A. S., 4168.
 McFerran, J. B., 3964.
 McGann, V. G., 2418.
 McGibbon, W. H., 3934.
 McGill, H. C. Jr., 3644.
 McGinnis, J., 3778.
 McGirr, E. M., 196.
 McGregor, M., 932.
 McGregor, W. S., 2594.
 McHale, D., 3703.
 Machlin, L. J., 864.
 McIlwain, P. K., 329.
 McIntosh, B. M., 9171.
 McIntosh, D. L., 2701.
 MacIntyre, I., 2669.
 MacIntyre, I. J., 1568.
 MacIntyre, R. W., 1575.
 MacIntyre, W. T. M., 822, 1017, 1189, 2996, 3658, 4037.
 MacKay, J. M. K., 1223, 2934.
 McKav, K. A., 686.
 McKelvie, P., 4162.
- Mackenzie, P. Z., 3453, page 562.
 McKeown, F., 3996.
 McKercher, D. G., 1122.
 Mackie, W., 4168.
 McKiel, J. A., 2871.
 McKinney, R. W., 2169.
 Mackintosh, G. M., 3653.
 Mackowiak, C., 730, 765, 2183.
 McLaren, A., 546.
 McLaughlin, R. F., 3410.
 McLean, D. M., 3978.
 MacLean, G. J., 2585.
 McLean, J. A., 4145.
 McLean, J. W., 285.
 MacLeod, A. J., 1135, 2924.
 Macleod, J., 4005.
 Macleod, N. S. M., 3655.
 McLoughlin, D. K., 1775, 3926.
 McLure, M. T., 2488.
 McManus, D., 819.
 McManus, E. C., 2143.
 McMillan, B., 697.
 MacMillan, R. L., 969.
 McNutt, S. H., 1353, 1354, 1355.
 MacOwan, K. D. S., 1311.
 McPherson, E. A., 144.
 Macpherson, I., 2577.
 Macpherson, I. A., 2205.
 MacPherson, L. W., 3978.
 Macpherson, R. K., 2721.
 McPherson, R. M., 2266.
 McQueen, E. J., 3978.
 McQueen, J. L., 2912.
 McQueen, K. F., 2877.
 Macrae, A. D., 3620.
 Macrae, R. R., 2635.
 Macrae, W. D., 1574.
 McShan, W. H., 3792.
 McTaggart, H. S., 1217, 1880.
 McWatt, E. M., 2522.
 Madden, D. H. L., 951.
 Maddy, K. T., 664, 665.
 Maděrová-Jarošová, V., 2341.
 Madogly Acabado, P., 2655.
 Mádr, V., 2552.
 Mäkinen, V., 190.
 Maestroni, G., 80, 2457.
 Mätzke, U., 3037.
 Magat, A., 2598.
 Magee, D. F., 4170.
 Magee, W. T., 3095.
 Maggio, V., 3501.
 Maghami, G., 455.
 Maglione, E., 3849.
 Magnusson, G., 4057.
 Magnusson, M., 1684, 1685.
 Magrane, W. G., 1929.
 Magwood, S. E., 2843.
 Mahaffey, L. W., 2011.
 Mahlandt, B. G., 2806.
 Mahmoud, A. H., 34.
 Mahoney, D. F., 675, 2492.
 Mahoney, G. W. A., 4185.
 Malboroda, V. S., 526.
 Mailloux, M., 650, 1743, 1744.
 Maistorović, G., 2451.
 Makay, L., 3791.
 Makstenieks, O., 388.
 Málaga T., A., 1462.
 Malanza, C., 2143.
 Maldonado Hernández, A., 3218.
 Malek, E. A., 4020.
 Malferrari, R., 2162.
 Malher, G., 3657.
 Malhotra, M. N., 1770.
 Malles, H. M., 600.
 Malik, B. S., 148.
 Malik, J., 2557.
 Málková, D., 742.
 Malmquist, W. A., 394.
 Maltman, J. R., 984.
 Mamchenko, B. I., 528.
 Mancini, R. E., 263.
 Mandel, L., 2647.
 Mandin, J., 3245.
 Mandouli, R., 3940.
 Manevich, Z. A., 1924.
 Mankiewicz, E., 20.
 Manktelow, B. W., 668, 1759, 1940.
 Mann, H. D., 2752, 3291.
 Mann, I., 4205.
- Mann, P. H., 3123.
 Mann, T., 2012, 2013, 2370, 4176.
 Mannick, J. A., 2297.
 Manning, R., 1054, 2184.
 Mannini, A., 3610.
 Mansjoer, M., 3986.
 Manso Ribeiro, J., 3251.
 Mansson, I., 3899.
 Månsson, J., 4197.
 Manten, A., 3498.
 Mantel, C. A., 2847, 3880.
 Mantovani, A., 3259.
 Manz, D., 3058.
 Maplesden, D. C., 1905.
 Maqsood, M., 1603.
 Marazza, V., 470, 4106.
 Marble, D. W., 888, 3389.
 Marcato, P. S., 2652, 2689, 3670.
 Marchese, B., 16.
 Marcus, S., 3534.
 Marek, K., 2566, 3616.
 Margalith, M., 1033.
 Margraff, I., 3766.
 Marintchevitch, S., 1749.
 Mário, R. O., 57.
 Markenson, J., 1033.
 Markov, A. A., 2903.
 Markowski, A., 3530.
 Marks, J., 3859.
 Markson, L. M., 1243.
 Marlowe, R., 3524.
 Marmalevskaya, L. Y., 2104.
 Marolt, J., 481, 1187.
 Marples, M. J., 671.
 Marquardt, W. C., 156, 699, 2651, 2976.
 Marraghini, M., 1430.
 Marraro, G., 744.
 Marrenghi, O., 3316, 3333.
 Marsboom, R., 152.
 Marsden, E., 1234.
 Marsh, C. L., 3696.
 Marsh, H., page 502.
 Marshak, R. R., 1045, 1380, 1381.
 Marshall, A. J., 2774, 3830, page 562.
 Marshall, I. D., 781, 1817, 2199.
 Marshall, J. D., Jr., 2065.
 Marshall, J. H., 2023.
 Marshall, P. G., 4016.
 Marshall, V., 772.
 Marston, H. R., 3028.
 Marthedal, H. E., 2441, 4099.
 Martin, A. A., 3329.
 Martin, J., 1334.
 Martin, J. E., 3059.
 Martin, L. E., 917, 1259.
 Martin, R. S., 2662.
 Martin, W. B., 2905.
 Martinaglia, G., 3848.
 Martinez, E. S., 3527.
 Di Martino, M., 208, 524, 2696.
 Martinsons, E., 896.
 Martutyan, E. M., 385.
 Marvin, H. N., 1908.
 Maržan, B., 465, 2174.
 Mascaro, L. A., 2684.
 Mašek, J., 3698.
 Mashkovskii, M. D., 2404.
 Mašić, M., 3944, 3945.
 Mason, E. J., 2207, 2568.
 Mason, H. C., 2216.
 Mason, R. S., 3295.
 Massey, J. W., 1986.
 Massignani, A. M., 2162.
 Mast, C., 3995.
 Mastronardi, M., 208, 524, 1064.
 Masvukov, A. V., 1700.
 Matveev, M., 2090.
 Matheka, H.-D., 3997.
 Mather, G. W., 2704.
 Mather, J., 3998.
 Mathews, J., 1478.
 Mathew, W. J., 2022.
 Mathois, H., 615, 1330, 2052.
 Matrone, G., 1899, 3017, 3337, 3393.
 Matscher, R., 897, 1652.
 Matsumura, K., 122, 319.
 Matsuo, T., 1987.
 Matanzawa, H., 191.
 Di Matteo, E., 3666.
- Matthews, P. R. J., 3152.
 Matthews, R. E. F., 1950.
 Matthias, D., 119, 433, 1118, 3598.
 Mattingly, P. F., 103.
 Matuka, S., 2551.
 Matumoto, M., 2526, 3966, 3967.
 Matusevich, V. F., 3551.
 Matveev, V. A., 3354.
 Maubecin, R., 1378.
 Mauléon, P., 1299.
 Maumence, A. E., 4000.
 Maurer, P. D., 2961.
 Maurice, G. E., 666.
 Maurin, 2304.
 Mauss, H., 3854.
 Maw, G. A., 1317.
 Maximovich, N. A., 1795.
 May, I., 1143.
 May, K. N., 3107.
 Mayaudon, T., H., 3310.
 Mayhew, R. L., 1177, 4041.
 Mayneord, W. V., 1235, 3373.
 Mayr, A., 725, 1807, 3265.
 Mazzaracchio, V., 398.
 Mazzini, C. A., 722.
 Medawar, P. B., 2221.
 Medda, A., 377, 1434, 2507.
 Medearis, D. N., Jr., 3610.
 Medvedev, N. A., 2824.
 Meese, M., 3485, 3486.
 Mehlichorn, G., 2342.
 Mehring, A. L., Jr., 909.
 Meier, H., 2201.
 Meijer, W. C. P., 205, 3376.
 Meinecke, C. F., 3101.
 Meis, J. W., 33.
 Meissner, G., 2055.
 Meites, J., 1967.
 Mejia, M. J., 3544.
 Mekouli, E., 1749.
 Meldal-Johnson, O. M., 2638.
 Melendez, L., 3576.
 Meloney, W. P., 2972.
 Mellors, R. C., 847.
 Melly, M. A., 1321.
 Melnick, J. L., 3110.
 Mel'nikova, A. D., 3215.
 Melton, M. L., 3212.
 Mémerly, G., 678, 679, 1073, 2127, 2128.
 Menascé, I., 3547.
 Mendes, J. A., 4104.
 Menges, R. W., 75.
 Di Menna, M. E., 2883.
 Menon, U. K., 2834.
 Menšik, J., 126, 127, 1800, 1810, 1811.
 Meranze, D. R., 1886.
 Merino E., E., 3199.
 Merler, E., 1402, 2879.
 Merriman, G. M., 3379.
 Merritt, G. C., 1397.
 Mesáros, E., 2190, 2546, 2555.
 Meschia, G., 2355.
 Mesler, R. J., Jr., 907.
 Du Mesnil Du Buisson, F., 3413.
 Mészáros, I., 571, 3675.
 Metcalf, J., 2354.
 Metzgar, R. S., 1514, 4004.
 Meyer, A., 345, 2088.
 Meyer, J. H., 2777.
 Meyer, M. E., 2850.
 Meyer, R. K., 177, 457, 936.
 Meyer, W., 2844.
 Meyn, A., 2047, 3512.
 Michael, F., 2051.
 Michael, J. G., 3538.
 Michaels, L., 1020.
 Michaelson, S. M., 1194.
 Michaelson, T. C., 2538.
 Michel, C., 686.
 Michel, J., 3537.
 Michel, J. F., 827.
 Michel, M. C., 3203.
 Michie, D., 546.
 Mickelsen, O., 1930.
 Micozzi, G., 3474.
 Van Middelgem, C. W., 145.
 Middleton, G. K., 2044.
 Miedzobrodzki, K., 1253.
 Mierzejewska, M., 29, 120, 1095.

- Mieth, H., 13.
 Migicovsky, B. B., 3024.
 Mihalović, R., 1964.
 Mihaiță, S., 2937, 3249.
 Mihajlović, B., 990.
 Mihajlovitch, S., 1476.
 Mihich, E., 1195.
 Mijović, V., 2709.
 Mikhallyukov, N. D., 1686.
 Mikhallyukova, N. D., 361.
 Miklašić, B., 514, 2174, 3770.
 Miklovich, N., 1774.
 Miksch, E. D., 4203.
 Milanov, M., 2090.
 Miles, A. A., 2460.
 Miles, B. J., 1609.
 Millan, J., 3940.
 Millar, E., 2845.
 Millen, T. W., 784.
 Miller, A. W. D., 3284.
 Miller, B. S., 3154.
 Miller, G. C., 1177.
 Miller, J. H., 3644.
 Miller, J. K., 2674.
 Miller, P. A., 1391.
 Miller, R., Jr., 3483.
 Miller, R. M., 1230.
 Miller, V. A., 2107, 2878.
 Miller, W. J., 2674.
 Miller, W. M., 371.
 Millian, S. J., 3247.
 Millican, R. C., 1014.
 Mills, C. F., 498, 869.
 Millson, G. C., 2935.
 Milne, A. A., 3772.
 Miner, M. L., 1422, 3838, 3925.
 Mingle, C. K., 2444.
 Minh, N. N., 757.
 Miniovich, F. L., 1044.
 Minne, J. A., 1939.
 Mironenko, V. I., 386.
 Mise, H., 549.
 Mishchenko, N. G., 1446.
 Missioux, L. M., 1260.
 Mitchell, D., 2945, 3177, 3258.
 Mitchell, K. G., 2131, 2280, 3686.
 Mitchison, N. A., 3277.
 Mitev, G., 1499.
 Mitroiu, P., 442.
 Mitropol'skii, A. S., 1411.
 Mitscherlich, E., 919, 1631.
 Mitskevich, V. Y., 1861.
 Mitsuhashi, S., 3875.
 Mittermayer, T., 3627.
 Miura, S., 2414, 3837.
 Mixner, J. P., 906, 937.
 Miya, F., 3734.
 Miyamae, T., 3837.
 Miyao, N., 2731, 2732.
 Mizuno, N. S., 1933.
 Minac, F., 1022.
 Modebe, A. N. A., 176.
 Möhlmann, H., 2919, 3485.
 Möller, T., 1550.
 Möse, J. R., 3323.
 Mogi, K., 1151.
 Mohan, R. N., 1081.
 Molchanov, S. G., 651.
 Moldavskaya, A. A., 346.
 Mollo, J. A., 2378.
 Moll, T., 1119, 3244.
 Mollaret, H. H., 3490.
 Mollie, J., 3684.
 Molyneux, G. S., 2723.
 Mommaev, S., 2719.
 Monda, V., 3532, 3613.
 Mondini, S., 300, 1753, 2040.
 Mongean, N., 2559.
 Monlux, A. W., 3827, page 562.
 Monlux, W. S., 3827, 4060, page 562.
 Monroe, R. A., 3374.
 Monsen, H., 2299.
 Montagne, P., 3302.
 Montalvo, G., 4154.
 Monteiro da Costa Faro, M., 1382.
 Montemagno, F., 2657.
 Montemurro, N., 1064, 2657.
 Montes de Oca, H., 2525.
 Monteverde, J. J., 2415, 2581.
 Montgomerie, R. F., 1223.
 Montgomery, R. D., 179.
 Moodie, E. W., 1213.
 Moody, M. D., 3881.
 Moore, B., 801.
 Moore, D. V., 1532.
 Moore, L. A., 3014.
 Moore, N. W., 1150, 1638.
 Moore, R. W., 790, 2480.
 Moore, T., 1214.
 Moosbrugger, G. A., 392.
 Mora, E. C., 1699.
 Morales, J. R., 2085.
 Morcos, M. B., 2691.
 Morehouse, G. L., 1026.
 Moreau, C., 1762.
 Moreau, M., 1762.
 Morgan, O., 1108.
 Morgan, D. O., 3337.
 Morgan, H. R., 2958.
 Morgan, J. F., 489.
 Morgan, W. J. Brinley, 1041, 2862.
 Moriconi, A., 3782.
 Morikawa, K., 3478.
 Moriaki, M., 1553.
 Mornet, P., 131, 450, 1116.
 Moro S., M., 1443, 1462, 2042, 3138, 3168.
 Moroshkin, B. F., 1582.
 Morozzi, A., 3575.
 Morrant, A. J., 1292.
 Morris, A. L., 842.
 Morris, B., 3874.
 Morris, D., 1668, page 235.
 Morris, T. R., 2662, 3102.
 Morrison, S. M., 3833.
 Mortelmans, J., 1023, 2056.
 Morter, R. L., 2866.
 Morton, W. R. M., 3088.
 Moseley, B. E. B., 1715.
 Moskalev, Y. I., 1934.
 Moss, W. G., 4161.
 Mossdorf, R., 1370.
 Mott, L. O., 2565.
 Moudgal, N. R., 2742.
 Moulder, J. W., 440, 2196.
 Moule, G. R., 554, 2770.
 Moulton, J. E., 2983, 3830, 3941.
 Moulton, W. M., 1459, 2923, 2943.
 Mount, L. E., 548, 1267, 1556.
 Mourad, S., 2881, 2882.
 Moursy, A. W., 1323.
 Mourzas, G. L., 1981.
 Movsesian, M., 4049.
 Movsesyan, T. B., 1009.
 Mowat, G. N., 2904.
 Moyle, G. G., 3531.
 Moynihan, W. A., 1221.
 Mozgov, I. E., 1289.
 Mozgovoi, A. A., 2251.
 Muehling, A. J., 4186.
 De Muelenaere, H. J. H., 279.
 Mueller, A. P., 457, 1831.
 Müller, H.-D., 323.
 Müller, J., 3898.
 Müller, M., 2113, 3180, 3716.
 Müller, W.-D., 1703.
 Müller-Beuthow, W., 405, 4067.
 Mülling, M., 533.
 Münchberg, F., 153.
 Münnich, H., 477.
 Mukerji, A., 323, 1320, 2445.
 Mukula, A.-L., 1589.
 Mullan, B., 3702.
 Muller, G. L., 2638.
 Mulligan, W., 1183, 1540, 2906, 3658, 4037.
 Mullins, A. M., 4131.
 Mullins, J., 141.
 Mulvey, P. F., Jr., 374.
 Mumford, D. H., 3528.
 Munday, B. L., 1002, 4073.
 Munroe, J. S., 847.
 Mura, D., 1676.
 Murár, J., 1866.
 Murase, N., 28.
 Murchison, T. E., 2941.
 Murgu, I., 4058.
 Murnane, T. G., 2188.
 Murray, G., 498.
 Murray, M. D., 1838.
 Murthy, G. K., 2749.
 Musaev, M. A., 1387.
 Musche, R., 2315, 3380.
 Mussagay, M., 424.
 Mustard, J. F., 1201, 1303.
 Muth, O. H., 1570, 3349.
 Muto, R., 2516.
 Myakushina, A. A., 1031.
 Myczkowski, K., 1961.
 Myers, G. S., Jr., 3014.
 Mylrea, P. J., 3810.
 Naaktgeboren, C., 4150.
 Nabholz, A., 311.
 Nadakal, A. M., 4026.
 Nagano, T., 122.
 Nagata, A., 2527.
 Nagayama, H., 3860.
 Nagra, C. L., 936.
 Nair, J. H., 1943.
 Nakagawa, M., 2410, 2411, 2800, 3837.
 Nakamura, J., 121.
 Nakamura, K., 2914.
 Nakamura, M., 3692, 3924.
 Nalbandov, A. V., 3102.
 Nani, S., 3458.
 Naracik, K., 3629.
 Narashimha Murthy, D. P., 780.
 Nardelli, L., 32, 727, 1440.
 Nardi, E., 1169, 1781.
 Narskii, S. V., 437, 438.
 Nash, T. A. M., 2134.
 el Nasri, M., 1364, 1765, 2887.
 Nassal, J., 313, 613, 1679, 2048, 3137, 3452, page 432.
 Natale, V., 349.
 Nathan, P. W., 4142.
 Natscheff, B., 853.
 Naumov, N., 2117.
 Nauryzbaev, E. N., 1031.
 Nava, G. A., 294.
 Nay, T., 1593, 3755.
 Nazar, T., 2858.
 Nazarenko, I. K., 2138.
 Nazaretyan, E. L., 437.
 Ndumbe, R. D., 3767.
 Neal, F. C., 1915.
 Nechaev, S. P., 2824.
 Nechval, I. T., 2137.
 Neeman, L., 39, 1701.
 Neeper, C. A., 1401.
 Negretti, F., 987.
 Neil, M. W., 3414.
 Nelken, D., 2590.
 Nelson, A. M. R., 1183, 2249.
 Nelson, E. L., 1515.
 Nelson, G. L., 4185.
 Nelson, G. S., 2237.
 Nelson, J. B., 681.
 Nelson, R., 3996.
 Nelson, W. A., 3205.
 Nemato, H., 2060.
 Nemeséri, L., 469, 701, 1257, 3116, page 432.
 Nemets, M. G., 199.
 Nesheim, M. C., 865.
 Neshyba, C., 1792.
 Neter, E., 628.
 Neuman, M., 2146.
 Neumann, F., 483, 2340, 3826.
 Neundorff, R., 3345.
 Nevenić, V., 3645, 3654, 3661, 4049.
 Neves, A. G. A., 4051.
 Neves, E. M., 4104.
 Newberne, J. W., 934, 3970.
 Newberne, P. M., 1205.
 Newcomb, W. C., 2781.
 Newland, H. W., 3018.
 Newland, L. G. M., 2131.
 Newling, P. E., 1203.
 Newsam, I. D. B., 1755.
 Newsom, I. D., 4131.
 Newton, G. R., 641.
 Newton, L. G., 1900.
 Newton, W. M., 4083.
 Newton, W. T., 211.
 Nguyen-ba-Luong, 757.
 Nguyen-Van-Ai, 978.
 Nicander, L., 4174.
 Nichol, I., 1105.
 Nichols, A. C., 8834.
 Nichols, R. E., 2268.
 Nickel, E.-A., 832.
 Nicol, L., 130, 2046.
 Nicol, T., 4162, 4195.
 Nicolaus, W., 2051.
 Nicoll, C. S., 1967.
 Nicolson, T. B., 3655.
 Niederehe, H., 3504.
 Niederländer, R., 3214.
 Niedermeier, R. P., 1841.
 Nielsen, K., 929.
 Nielsen, S. W., 485, 1193.
 Niemand, H. G., 1888.
 Niemoeller, H., 4156.
 Niesar, K.-H., 3068.
 Niemiarowski, S., 3727.
 Nigg, C., 3863.
 Niiio, L., 1198, 1199, 1302.
 Nikitin, I. N., 2124.
 Nikolajev, K., 116.
 Nikolitsch, M., 2400, page 300.
 Nilakantan, P. R., 1136, 1500.
 Nilsson, G., 191, 1218.
 Ninomiya, W., 3155.
 Nisbet, D. I., 3105.
 Nishida, T., 938, 1906.
 Nishimura, Y., 1694.
 Nistor, T., 4019.
 Nitoiu, I., 3228.
 Niven, J. S. F., 1794.
 Niznansky, F., 2859, 3518.
 Njoku-Obi, A., 2063.
 Noakes, D. N., 916.
 Nosál, M., 3518.
 Nobel, T. A., 483, 2340, 3326, 3793.
 Nobili, I., 1497, 3467.
 Noble, R. C., 497.
 Nobuto, K., 1089, 3237.
 Noe, L., 22.
 Noffsinger, J., 4119.
 Noice, P., 114.
 Norberg, I., 4197.
 Norcross, N. L., 2155.
 Nordan, H. C., 4204.
 Nordberg, B. K., 1601, 2046, 3469.
 Norden, C. J., Jr., 1806.
 Nordin, A. A., 315.
 Nordin, B. E. C., 4081.
 Nordström, G., 191, 1218.
 Norman, M. J. T., 1999.
 Norris, K. R., 3281.
 Norton, H. W., 856.
 Norval, J., 331, 1048.
 Nosál, M., 3518.
 Noskov, N. M., 252.
 Nota, N. A., 3458.
 Novák, Z., 1006.
 Novák, J., 3514.
 Novikova, L. S., 651.
 Novikova, M. P., 1690.
 Nový, J., 1251.
 Nowacki, E., 2712.
 Nowak, H. F., 4105.
 Nowakowski, H., 299.
 Nugara, D., 2277, 2278.
 Numans, S. R., 921.
 Nunn, W. R., 3109.
 Nutting, W. B., 2605.
 Nystrom, G., 1360.
 Oakley, G. A., 3832.
 Obel, A.-L., 432.
 Oberdorfer, A., 3846.
 Oberfeld, H., 2398.
 Oberosler, R., 3463, 3464.
 Oberröder, C., 1983.
 Obiger, G., 1323.
 O'Brien, R. D., 1841.
 O'Byrne, T., 1588.
 Ochi, Y., 1134, 2043.
 Ockner, R. K., 2708.
 O'Connor, M., page 686.
 O'Dell, B. L., 1205, 3351.
 Odell, G. V., 242.
 Oelrichs, P. B., 3747.
 Officer, J. E., 1144.
 Ogata, M., 2043.
 Ogilvie, J. M., 1204.
 Oghyanov, D., 116.
 Ognjanov, D., 1474.
 O'Grady, J. J., 2318.
 O'Halloran, M. W., 2287, 4073.
 Oka, S., 8560.
 Okamoto, R., 935.
 Okaniwa, A., 1127, 3597.

- Okawa, K., 2705.
 Okazaki, K., 676.
 O'Kelly, J., 3384.
 Okonowski, Z., 2286.
 Okul, S., 192.
 Oláh, P., 1479, 1790, 1814.
 Olander, H. J., 1121.
 Oldfield, J. E., 186, 1570, 3849.
 Oldham, J. N., 3001.
 Olechnowicz, A. F., 99, 412.
 Olesiuk, O. M., 690, 2477.
 Olitzki, A. L., 1033, 1040, 1723.
 Oliva, O., 3800.
 de Oliveira, H., 2123.
 Oliver, W. T., 1587, 2316.
 Oliver-González, J., 159.
 Olrog, C. C., 107.
 Olsen, L. S., 476.
 Olsen, M. W., 1643, 2003, 2211.
 Olson, C., 1003.
 Olson, L. J., 1170.
 Olson, N. O., 682, 4138.
 Olson, T. A., 3555.
 Olsson, B., 1946, 3899.
 Olsson, N., 2142.
 Omar, A. R., 3005, 3735.
 O'Moore, L. B., 3639.
 Omuro, M., 1059.
 Onchi, T., 63.
 de Ong, E. R., 2792.
 Opletal, J., 421.
 Opištil, M., 2546.
 Orfei, Z., 398.
 Orgebin, M.-C., 3779.
 Orhel, T. C., 2650.
 Orlandella, V., 31, 1012.
 Orlov, A. I., 1337.
 Ormerod, W. E., 3922.
 Ormiston, E. E., 1954, 2366.
 Orr, J. H., 984.
 Orsatti, G., 3850.
 Orsborn, J. S., 1211.
 Orsadius, K., 191, 908, 1218, 3352.
 Orth, G., 131.
 Ortmayer, H., 3917.
 Orue, J., 678, 679, 1073.
 Osborne, A. D., 3546.
 Osborne, H. G., 292.
 Ose, E. E., 693, 1767.
 Osebold, J. W., 2063, 3566.
 Oser, B. L., 839, 840.
 Oser, M., 839, 840.
 Oshima, Y., 2133.
 Osol, A., 1665, page 106.
 van Oss, C. J., 1951.
 Ostby, P. C., 3335.
 Osteen, O. L., 394, 2565.
 Osterhoff, D. R., 1517.
 Ostler, D. C., 2307.
 Ostrovskaya, N. N., 347, 1373.
 O'Sullivan, J. G., 3907.
 Ota, Y., 2165.
 Otken, L. B., Jr., 2899.
 Ott, A., 636.
 Ötte, E., 83, 758.
 Oudar, J., 870, 1010, 2066, 2183.
 Ovejero, S., 393.
 Owen, C. R., 33.
 Owen, E. C., 866.
 Owen, J. B., 2387.
 Owen, L. N., 3006, 3394.
 Oyaert, W., 1273, 1276, 2661.
 Oyrzanowska, J., 3044.
 Pachev, I. P., 2397.
 Packchanian, A., 1746.
 Packer, R. A., 3175.
 Page, L. A., 1145, 3150.
 Pages, A., 1494.
 Pagnini, U., 438.
 Paine, T. F., Jr., 3896.
 Pakhomova, N. G., 376.
 Palacios, C., 96.
 Palacios García, C. A., 3213.
 Palacios Remondo, J., 4095.
 Palczuk, N. C., 3514.
 Palec, V., 3481.
 Palisse, M., 1707, 3492.
 Pallaske, G., 2786, 2815, page 300.
 Palludan, B., 4084.
 Palm, P. E., 1943.
 Palmer, A. C., 4083, 4097.
 Palmer, P., 3111.
 Pålsson, P. A., 425, 8343.
 Palyusik, M., 43.
 Pande, B. F., 1162.
 Pande, P. G., 1410, 2100, 2143.
 Pandit, C. N., 4025.
 Panebianco, J., 167.
 Panijel, J., 3633.
 Panina, G., 727, 1440.
 Panjčić, D., 2451.
 Bankratov, A. Y., 357, 2853.
 Panysheva, L. V., 1577.
 Papadakis, J. A., 46.
 Papadopol, M., 1138.
 Papadopoulos, A., 3370.
 Papp, E., 1234, 2026.
 Papparella, V., 16, 172, 436, 3594.
 Paraf, A., 603, 723, 3217.
 Paramanathan, D. C., 2240.
 Paredis, T., 3438.
 Parish, W. E., 1153, 2653.
 Patfizek, M., 2267.
 Park, R. D., 3456, page 432.
 Parker, A. H., 2227.
 Parker, H. E., 501.
 Parker, H. R., 1270, 1965.
 Parker, R. L., 2949.
 Parker, W. H., 1183.
 Parkes, A. S., 3120, page 432.
 Parks, J. J., 4000.
 Parmeggiani, P. L., 3409.
 Parmelee, G. W., 528.
 Parnak, D. T., 2443.
 Parnas, J., 69, 343, 647, 2452, 2857, 3516, 3832.
 Parnell, I. W., 3653.
 Partington, H., 3348.
 Paruzhinskaya, L. S., 2625.
 Van Parys, P., 152.
 Pascal, S., 860.
 Pascoe, R. R., 1339, 1343, 3840.
 Pascu, L., 3139.
 Pascu, T., 4019.
 Pasquier, J. F., 3854.
 Passmore, P., 3030.
 Pásztor, L., 572.
 Paterlini, G., 2771.
 Paterson, A. B., 2950.
 Patnaik, B., 1526, 2983.
 Patterson, L. L., 932.
 Patterson, R., 2213, 2964.
 Patterson, R. E., 576.
 Pattison, F. L. M., 3373.
 Pattison, L. H., 2935, 3152.
 Patyrya, W., 3206.
 Pauer, T., 2610.
 Paufer, S., 1631.
 Paul, I., 2385.
 Paul, S., 1865.
 Pauling, L., 4143.
 Păunescu, G., 1152, 2985.
 Paultrizel, R., 2485.
 Pavlov, N., 1326.
 Pavlov, P., 2090, 3303.
 Pavri, K. M., 1451, 2530.
 Payne, C. G., 2756.
 Payne, D. J. H., 3136.
 Payne, J. M., 1034, 1035, 1126, 1609, 2071, 2720, 2818.
 Payne, L. C., 3696.
 Payne, L. N., 3635, 4001.
 Peacock, R., 1183, 2249.
 Peacock, R. M., 2276.
 Pearce, P. J., 198.
 Pearson, D. L., 3934.
 Pearson, O. C., 2374.
 Pearson, E. G., 2262, 2607.
 Pearson, I. A., 3493.
 Pearson, J. C., 815.
 Pechác, O., 421.
 Pecheur, M., 2246.
 Peck, E. F., 83, 758.
 Peckham, M. C., 2059.
 Pedersen, P. S., 7, 1671.
 Pedini, B., 1572.
 Pehl, K.-H., 434, 1663, 2558, page 52.
 Pelkovski, J., 3179.
 Pellegrini, N., 3415, 3776.
 Pellegrini, S., 3415, 3776, 3799.
 Pelliérdy, L., 1423, 1774, 2397.
 Penfold, T. W., 3853.
 Penny, R. H. C., 4117.
 Peo, E. R., Jr., 3696.
 Peoples, S. A., 2337.
 Peralta, P. H., 2188.
 Peredereev, N. I., 1581.
 Pereira, H. G., 1794.
 de Perez, C. B., 107.
 Perini, G., 635, 3463, 3464.
 Perkins, E. H., 3534.
 Perman, V., 1239, 1933.
 Perova, K. S., 1044.
 Perrault, A., 1402.
 Perry, B. T., 3273, 3276.
 Perry, E. J., 297.
 Persson, F., 3606.
 Persson, S., 3606.
 Pestil, L., 1704, 2438.
 Petek, M., 3939.
 Petermann, H. G., 724, 730.
 Peters, J. C., 203.
 Peters, R. A., 527, 3737.
 Petersen, W. E., 2966.
 Peterson, H. O., 2972.
 Peterson, W. D., Jr., 3257.
 Peterson, W. J., 2150.
 Peteshev, V. M., 1843.
 Petrelius, T., 2077.
 Petrenko, G. G., 517.
 Petrov, V. M., 516.
 Petrova, E. V., 2327.
 Petrović, D., 614, 2174.
 Petrović, K., 4043.
 Petrović, M., 3945.
 Petrović, Z., 4043.
 Petrovsky, M., 3189.
 Petter, F., 3195.
 Pfeiffer, H., 154.
 Philip, J. R., 56, 3363, 3937.
 Philippo, W., 1140.
 Phillips, B. P., 3045.
 Phillips, G. D., 3758, 4164.
 Phillips, J. E., 3910.
 Phillips, W. P., 2083.
 Phillipson, A. T., 4163.
 Phillipson, R. E., 4027.
 Phu, L. H., 767.
 Piccolino, G., 3259.
 Pichaicharnarong, A., 3754.
 Pichugin, L. M., 651.
 Pick, R., 1893.
 Pickens, E. G., 2583.
 Pickering, D. E., 3388.
 Pickett, M. J., 1515, 2331, 3438.
 Piekarski, G., 2149, 2499, 3214.
 Pier, A. C., 2835, 3544.
 Pierce, A. E., 1295, 2738.
 Piercy, S. E., 3603.
 Pieresca, G., 597, 3563.
 Piergrossi, A., 208, 524.
 Pierotti, P., 215, 3301, 3714.
 Pierre, M., 3657.
 Piette, J.-M., 3302.
 Pignou, H., 290, 1636.
 Pigout, L., 636.
 Pilet, O., 131, 431, 773, 1129.
 Pilipavicius, J., 3141.
 Pillai, C. P., 2932.
 Pille, E. R., 1452.
 Pilz, W., 395, 731, 1788.
 Pinkiewicz, E., 117, 1803, 1804, 1805, 2291.
 Pintilie, R., 2985.
 Pinus, A. A., 1538.
 Pióro, J., 66.
 Pipano, E., 2146.
 Pipkin, A. C., 390.
 Pirtle, E. C., 2179.
 Pisanu, S., 1676.
 Pistey, W. R., 3395.
 Pistor, W. J., 818.
 Pitchford, R. J., 2236.
 Pitre, J., 1829.
 Plusiński, W., 2685.
 Placidi, L., 2424.
 Plackett, P., 368, 2475.
 Plagnol, H., 207.
 Planas, J., 941.
 Planes de Banchoer, E., 3220.
 Planterose, D. N., 3942.
 Plastring, W. N., 2904.
 Platonow, N., 1587.
 Pledger, R. A., 2505.
 Plescia, O. J., 3514.
 Plessing, H., 4067.
 Pleva, J., 420, 2540.
 Pleva, V., 2555.
 Plöger, W., 2367.
 Plommet, M., 301, 302, 3841.
 Plotkin, S. A., 15.
 Plowright, W., 1117, 2925.
 Plumer, G. J., 1467.
 Pöbisch, A., 3367.
 Podgurniak, Z., 3324.
 Podkamennykh, I. M., 2409.
 Podliachouk, L., 1516.
 Podlinov, I. S., 516.
 Podraský, J., 602.
 Poelma, F. G., 53.
 Poenaru, I., 3909.
 Pogonyailo, G. F., 1128.
 Poirier, M., 3239.
 Pokorná, J., 3256.
 Pokorny, B. A., 3233.
 Poláková, M., 1872, 1874.
 Polatnick, J., 1787.
 Polge, C., 2370.
 Polidori, F., 1568.
 Polishchuk, F. G., 3298.
 Politynska, E., 2821.
 Pollard, M., 449, 790, 1825.
 Polley, J. R., 2917.
 Pollock, M. E., 630.
 Polo Jover, F., 3601.
 Polóny, R., 420, 1142, 2533, 2564, 3627.
 Pols, J. W., 1426, 3282.
 Polukhin, F. S., 1219.
 Polyakin, V. V., 1577.
 Polyakov, I. I., 346.
 Polyanskaya, M. V., 4023.
 Pomerat, C. M., 2915.
 Ponomarenko, V. A., 4056.
 Pool, W. A., 2031, page 235.
 Poole, J. P., 680.
 Pooley, F. E., 2842.
 Popa, C., 2957.
 Pope, M., 2907, 3249.
 Pope, A. L., 2626.
 Pope, C. W., 2022.
 Pope, L. S., 2374.
 Popescu, A., 2906, 2008, 2947.
 Popescu, L., 2906.
 Popesko, P., page 235.
 Popken, F., 638.
 Popken, F. E., 370.
 Popov, T., 116.
 Popovici, V., 1143.
 Poppensiek, G. C., 2155.
 Popper, H., 839, 840.
 Portela, E., 263.
 Portela, E. A., 3329.
 Porteous, J. W., 362.
 Porter, D. A., 2991.
 Porter, J. W. G., 3636.
 Porterfield, I. D., 2966.
 Porterfield, J. S., 2959, 3954.
 Portolés, A., 618.
 Pospolova, Z. K., 1843.
 Pospíšil, R., 3627.
 Postnikov, V. S., 1580.
 Potash, L., 3962.
 Potel, J., 330, 2429, 3865.
 Potel, K., 2822.
 Potemkina, V. A., 2030.
 Potter, B. J., 3700.
 Pouhatch, I., 1749.
 Poul, J., 2164, 2319.
 Pounden, W. D., 10, 2116, 2412, 2658.
 Poupard, L., 1864, 2246.
 Pourquier, M., 3245.
 Poussot, A., 636.
 Powell, H. M., 3943, 3995.
 Powelson, D. M., 3915.
 Powers, L. E., 2614.
 Powers, T. E., 4136.
 Poynter, D., 1183.
 Pozzi, L., 1294.
 Prakash, P., 2431.
 Prange, H., 3139.
 Prasad, H., 1421, 2902.
 Prat, J., 1227, 2692, 3628.
 Prati, G., 1753.
 Dal Prato, A., 32, 1440.
 Pratt, C. W. M., 1977, 2284.
 Pratt, R., 1665, page 106.
 Precuo, O., 1243.
 Preibisch, J., 3432.
 Pressman, D., 794.
 Preston, K. S., 1915.
 Preston, T. R., 1557, 3767.

- Preuss, B., 2087.
 Previtera, A., 1681.
 Price, J. I., 748.
 Price, R. D., 3585.
 Price, S. M., 3403.
 Pridham, T. J., 3261.
 Priedniek, O. K., 1626.
 Prier, J. E., 1105, 2874.
 Prier, W. D., 372.
 Priss, I. S., 437.
 Pritchard, W. R., 2990, 3439, 3957.
 Proctor, D. L., 3677.
 Prodanov, P., 1944.
 Prokhorov, A. V., 619.
 Prokudin, A. V., 1617.
 Prokdupk, K., 992.
 Pross, E., 4066.
 Prostysakov, A. P., 538, 3064.
 Proulx, P., 1941.
 Provost, A., 3201.
 Prystowsky, H., 2354.
 Przyłęcki, S., 66.
 Pućar, Z., 273.
 Pudles, J., 4051.
 Puestow, K. L., 1926.
 Puglioli, U., 22.
 Puhac, I., 351.
 Puisségur, J. A., 737.
 Pullar, E. M., 4207.
 Pullman, T. N., 1281.
 Pulverer, G., 355.
 Pumarola, A., 3496.
 Te Punga, W. A., 3531.
 Purves, D., 1563.
 Pustovar, J. P., 2238.
- Quader, M.-A., 37.
 Quaglio, G., 3399.
 Quash, G., 3633.
 Quatrefores, H., 1494, 2450, 3245.
 Querner, H., 494.
 Quesada, A., 3501, 3532, 3615.
 Queval, R., 1516.
 Quick, A. J., 2725.
 Quicke, G. V., 279.
 Quilligan, E. J., 267, 268.
 Quin, A. H., 2929.
 Quinchon, C., 605.
 Quinn, L. Y., 3631.
 Quintero, G. A. L., 3286.
 Quiroz Vega, C. A., 3263.
- Rac, R., 1419, 3718.
 Race, G. J., 1620.
 Rachlin, W., 1951.
 Radeleff, R. D., 804, 1991, 2752.
 Radermacher, F., 2648.
 Radev, G., 284.
 Radford, H. M., 2767.
 Radkevich, P. E., 526, 708, 3564.
 Radley, J. M., 1295, 3373.
 Radominski, W., 2920.
 Radostits, O. M., 3241.
 Răducănescu, H., 3909.
 Radziszewska, D., 66.
 Rae, A. L., 1571.
 Raethel, H. S., 381, 1188.
 Raettig, H., 4008.
 Rafvi, A., 1449, 2112, 2153.
 Ragel, F., 1963.
 Ragel, L. G., 1189, 1496, 1504.
 Raghavan, N., 2834.
 Ragni, M., 3849.
 Ragsdale, A. C., 245, 246, 556, 557.
 Rahlmann, D. F., 3411.
 Rahman, M. M., 188, 1907.
 Rahneberg, H.-U., 1501.
 Rai, P., 148.
 Rajapalan, P. K., 780.
 Rajakoski, E., 568, 2762.
 Rajtar, V., 1006.
 Raiya, B. S., 2819.
 Rakhilin, V. K., 77.
 Ralston, D. J., 3884.
- Ramachandran, S. P., 1500.
 Ramisse, 2435.
 Rammell, C. G., 3784.
 Rampon, R., 2068, 2114.
 Rampton, C. S., 3583.
 Ramsay, W. R., 1389.
 Ramsey, F. K., 1915, 3957.
 Randall, C. C., 754.
 Randall, J. B., 2395.
 Randall, S. S., 2390.
 Rankin, J. D., 997, 1338, 2425, 2818.
 Ranney, A. F., 1327.
 Rao, S. B. V., 348, 2835, 3502.
 Rapić, S., 1246, 3770.
 Rappaport, C., 580, 581.
 Rappaport, H. P., 580.
 Rasch, K., 1709.
 Rasmussen, H., 1281, 2357.
 Ratcliffe, H. L., 2260.
 Ratner, J. J., 3234.
 Rauch, H., 2605, 3345.
 Rauch, H. C., 2331.
 Raun, E. S., 3283.
 Rauscher, F. J., 1547.
 Ravaoli, L., 398.
 Rawes, D. A., 1181, 2988, 2993, 4038.
 Ray, H. N., 1770.
 Raynaud, J., 2700.
 Raynaud, M., 49.
 Read, R. B., Jr., 783.
 Reagan, R. L., 753.
 Reardon, T. F., 3795.
 Reber, E. F., 856.
 Reckel, R., 2225.
 Reculard, P., 130, 2946.
 Reczko, E., 2910.
 Redaelli, G., 635, 3877.
 Redhage, W. A., 2197.
 Redon, P., 2536.
 Reed, C. M., 3327.
 Reed, H. C. B., 657, 2772.
 Reed, R. E., 665, 818.
 Rees, K. R., 1945, 3740.
 Rees, R. J. W., 2053.
 Rees, T. A., 2072.
 Reeves, J. C., 1283.
 Regnery, D. C., 781.
 Reháček, J., 1110.
 Reich, C. V., 3891.
 Reich, M., 2360.
 Reid, J., 3984.
 Reid, J. A., 2600.
 Reid, R. L., 3451, page 300.
 Reid, N. R., 2922.
 Reinders, J. S., 1865.
 Reinecke, R. K., 1540, 1851.
 Reineke, E. P., 1603, 4181.
 Reinius, L., 190.
 Reis, J. M., 947.
 Reisinger, R. C., 2434.
 Reissig, M., 2160.
 Rejas, F., 303.
 Reimentsova, M. M., 1733.
 Remington, J. S., 3212.
 Remmert, L. F., 1570.
 Rempel, J. G., 3235.
 Renault, L., 787, 1707, 3492, 3669.
 Rencz, K., 421.
 Rendel, J., 3080.
 Rendtorff, R. C., 2562.
 Renieri, G., 744.
 Rennison, B. D., 2599.
 Renoux, G., 2096.
 van Rensburg, S. J., 3852.
 Renwick, C. C., 3105.
 Rerat, A., 3684.
 Reshetnyak, V. Z., 376.
 Ressay, A. A., 98, 324, 3987.
 Restall, B. J., 2758, 4191.
 Restani, R., 3259, 3666.
 Rettenmaier, L., 1677.
 Renber, H. W., 2374.
 Reuleaux, I.-R., 1468, 2177.
 Reuss, U., 445, 1374, 3983.
 Reusse, U., 3523.
 Revenok, N. D., 1813.
 Reynolds, G., 3351.
 Reynolds, W. M., 4068.
 Rheault, J. P. E., 3391.
 Rhodes, L. J. L., 1741.
 Rhodes, W. H., 912, 913.
 Rhone, J. R., 4119.
- Ribelin, W. E., 496.
 Ricca, M., 3729.
 Rice, C. E., 404, 2962, 2965, 3236, 3479.
 Rice, E., 648.
 Rich, C., 3738.
 Rich, G. B., 4008.
 Richards, W. P. C., 2833, 2940.
 Richou, R., 605.
 Richou, R., (Mme), 605.
 Richter, O., 3129.
 Richter, S., 1182.
 Riddell, J., 331.
 Riddell-Swan, J. H., 1628.
 Riegel, K., 3764.
 Riehl, L. A., 803.
 Riemenschneider, R. W., 2663.
 Rigdon, R. H., 1232, 3048, 3725, 4100.
 Rijavec, M., 1879, 2609.
 Ring, G. C., 4161.
 Ringdal, G., 321.
 Ringer, R. K., 2022.
 Rioche, M., 50, 2319.
 Rioux, J. A., 1494.
 Ripert, C., 2485.
 Ris, A., 388.
 Riser, W. H., 4080.
 Rislakki, V., 1431, 3243.
 Ristic, M., 1396.
 Ritchie, J., 1222.
 Ritchie, N. S., 2276.
 Rivenson, S., 1436, 3220, 3221, 3572.
 Rizzo, V. J., 1909.
 Robbins, D. J., 496.
 Roberts, A. H., 2272.
 Roberts, C. W., 4189.
 Roberts, E. D., 2191.
 Roberts, F. H. S., 1842.
 Roberts, H. F., 3382.
 Roberts, R. H., 804, 3291.
 Roberts, R. M., 56.
 Roberts, S. J., 2382.
 Robertson, A., 1720.
 Robertson, H. A., 289, 2358.
 Robertson, I. S., 3401.
 Robertson, J., 866.
 Robertson, L., 1369.
 Robijns, K. G., 620.
 Robinson, C. E., 2982.
 Robinson, G. A., 1303, 3762.
 Robinson, I. M., 1558.
 Robinson, J., 1183.
 Robinson, R. Q., 2167.
 Robinson, T. J., 3795.
 Robinson, V. B., 934.
 Robson, D. S., 1465, 2968.
 Robson, J., 3920.
 Rodabaugh, D. E., 123, 2851.
 Rodda, G. M. J., 3845.
 Rode, B., 1912.
 Rode, L. J., 3511.
 Rodnan, G. P., 259.
 Rodriguez, C. C., 3199.
 Rodriguez, J. L., Jr., 803.
 Rodriguez H., J. E., 3659.
 Rodwell, A. W., 1766, 3553.
 Roe, C. K., 3364.
 Röhr, W., 51, 2045, 3495.
 Röhrer, H., 441, 562, 766, 1094, 1663, page 52.
 Van Roekel, H., 690, 2477.
 Rössger, M., 3673.
 Roger, H., 2244.
 Rogers, A. W., 8632.
 Rogers, D. E., 1321.
 Rogers, E. S., 2710.
 Rogers, K. B., 3153.
 Rogers, S., 1932.
 Rogers, W. P., 1172.
 Rogier, J. C., 501.
 Rogoff, W. M., 798, 2975.
 Roller, W. L., 3814.
 Rollins, W. C., 3104.
 Rollinson, D. H. L., 3109.
 Romagnoli, A., 711.
 Romanik, J., 87.
 Romanoff, A. L., 2034, page 235.
 Romberg, P. F., 672, 1060.
 Romboli, B., 3301, 3303, 3333.
 Romić, Z., 350.
 Romijn, C., 1960.
 Rommel, P., 2005, 3112.
- Rommel, W., 2005, 3112.
 Ronald, K., 3978.
 Ronéus, G., 354.
 Rood, K. G., 2022.
 Rooney, J. R., 2807.
 Rosa Azevedo, J., 3251.
 Rosaschino, F., 1718.
 Rose, A. L., 5812.
 Rosé, F., 160.
 Rose, H., 3032.
 Rose, H. M., 1108.
 Rose, J. H., 529, 1541, 4045.
 Rose, N. R., 1514.
 Rosen, F. S., 2879.
 Rosen, W. G., 2268.
 Rosenberg, J. C., 4059.
 Rosenberg, M., 2960.
 Rosenberg, S. A., 4059.
 Rosenquist, B. D., 75.
 Roshdy, M. A., 3269.
 Rosicky, B., 3629.
 Rosiek, O., 3727.
 Rosival, F., 1783.
 Rosner, S. F., 2535.
 Ross, C. A. C., 3965.
 Ross, C. V., 1857.
 Ross, D. B., 3347.
 Ross, E., 915.
 Ross, J. G., 2989, 3651, 3652.
 Ross, M. R., 2196.
 Ross, S., 2075.
 Rossan, R., 2145.
 Rosedale, P. D., 2105.
 Rossi, C., 286.
 Rossi, L., 2428, 2556.
 Rossow, N., 218, 228.
 Rostom, V. H. A., 90.
 Rotblat, J., 2298, 4103.
 Roth, A. R., 2595, 3288.
 Roth, E. B., 2456, 2873.
 Roth, I. L., 2419.
 Rothchild, I., 265, 266, 267, 268.
 Rothe, K., 3420.
 Rothe, W. E., 4101.
 Rothenberger, G., 4030.
 Rothschild, 280, page 686.
 Rothstein, N., 1189, 1877, 4055.
 Rott, R., 2952, 2953.
 Rousseau, J. E., Jr., 3014.
 le Roux, J. M. W., 2713.
 Rowe, W. P., 3262.
 Rowell, J. G., 548, 1267.
 Rowley, I., 2753.
 Rowsell, H. C., 1201, 1303.
 Rowson, L. E. A., 567, 1150, 1638, 2013, 3789.
 Roy, D. N., 2324.
 Roy, L., 2198.
 Rozansky, R., 3885.
 Rubaj, B., 117, 1798.
 Rubarth, S., 1916.
 Rubin, H., 2213.
 Rubin, R., 1185.
 Rubini, M. E., 4154.
 Ruch, T. C., 595.
 Ruckebusch, Y., 870, 1010.
 Rudnev, M. M., 135, 1510.
 Rudolph, W., 3470.
 Rueger, M. E., 3585.
 Rüsse, I., 3402.
 Ruiz Castañeda, M., 3174.
 Rumsey, G. L., 2300.
 Runnells, R. A., 3827, page 562.
 Rusev, K., 1498.
 Rusev, V., 1974.
 Russell, R. R., 1759, 2440.
 Russell, R. S., 2747.
 Rust, J. D., 1014.
 Rusu, V., 3248.
 Rutqvist, L., 2077.
 Ryle, M., 4201.
 Ryniewicz, Z., 3530.
 Rys, R., 2666.
 Ryzantseva, N. E., 1813.
- Saal, J. R., 2492.
 Saathoff, M., 2149.
 Sabatier, H., 1141.
 Sabban, M. S., 2520.
 Saheo, D., 221, 3368.
 Sabine, J. R., 1210, 3699.
 Sacco, T., 3573.
 Sackmann, W., 3069.
 Sadhu, D. P., 3076.

- Sadler, P. W., 3976.
 Sadler, R., 2967.
 Sadler, W. W., 1037.
 Saeter, E. A., 2115.
 Said, A. H., 1058.
 Sainclivier, M., 3841.
 Saito, K., 2527.
 Sajonski, H., 559.
 Sakanyan, S. S., 428.
 Sakazaki, R., 54.
 Sakkubai, P. R., 1136.
 Sälägeanu, G., 3856, 4098.
 Salah, M. N., 3031.
 Salei, P. I., 652, 2007.
 Salenstedt, C. R., 1132, 3805.
 Salganik, M. G., 1649.
 Salk, J. E., 105.
 Salmin, I. P., 257.
 Salzmann, N. P., 3815.
 Samoletov, A. I., 1649.
 Samson, K. S., 4042.
 Samuel, J. McA., 3861.
 Sanchez Botija, C., 3601.
 Sander, E. G., 1278.
 Sanders, E., 2349.
 von Sandersleben, J., 3672.
 Sandstedt, H., 1349.
 Sanford, J., 923.
 Sanger, V. L., 2658, 2825, 3429, 3952.
 Sano, K., 3313.
 Sansom, B. F., 210, 1604, 1609, 1938, 2720.
 Santamarina, E., 1635.
 Santa Rosa, C. A., 349.
 Santero, G., 727, 1440.
 Santi, A., 3275.
 Santiago Luque, J. M., 3650, 4095.
 de Santiago y Redel, E., 1075.
 Saphon, 1004.
 Sapio, U., 2200.
 Sapre, S. N., 2443.
 Sargeant, K., 3384, 4118.
 Sasaki, A., 2314.
 Sasaki, N., 3313.
 Sasaki, S., 3155.
 Saslaw, S., 666.
 Sasu, E., 1138.
 Sato, G., 2414, 3837.
 Sato, I., 3875.
 Sato, M., 4180.
 Satō, N., 1780.
 Sato, U., 1694.
 Sauer, F., 2678.
 Sauer, R. M., 970, 972, 1105.
 Saunders, C. N., 1244.
 Saunders, D. H., 2663.
 Saunders, L. Z., 845, 1799.
 Saunié, L., 2424.
 Saurat, P., 18, 2442.
 Sautter, J. H., 1933.
 Sauvestre, M., 174.
 Savage, J. E., 1205.
 Savan, M., 2940, 3241.
 Savard, K., 2371.
 Sawyer, P. N., 2726.
 Saxer, E., 750, 1457.
 Sazawa, H., 237.
 Scarnell, J., 2105, 2245.
 Scatterday, J. E., 1442.
 van der Schaaf, A., 890, 1713, 3193.
 Schaaf, J., 322, 614, 1000, 1830.
 Schaaf, K., 2570.
 Schachter, D., 4165.
 Schaedler, R. W., 2118, 3854.
 Schäfer, E., 2149, 3214.
 Schaefer, K. E., 4156.
 Schäfer, W., 2953.
 Schaeffer, M., 2167.
 Schaeffler, W. F., 834, 3664.
 Schaetz, F., 3509.
 Schaible, P. J., 4070.
 Schaiowicz, F., 2525.
 Schalm, O. W., 2263.
 Schatz, D. L., 797.
 Schebitz, H., 486, 1875.
 Schechtman, A. M., 796.
 Scheder, E. P., 3127.
 Scheinberg, S. L., 2225.
 Schenker, H., 838, 4165.
 Scher, A. M., 2344.
 Schiavo, A., 3266.
 Schiefer, B., 165, 1927.
 Schierholz, H., 64.
 Schildbach, R., 637.
 Schilling, E., 3368.
 Schimmel, D., 1897.
 Schimmelpennig, H., 1469.
 Schinazi, L. A., 2615.
 Schinckel, P. G., 3013.
 Schindler, H., 3096.
 Schindler, R., 409.
 Schipper, I. A., 114, 3744, 3957.
 Schjelde, O. A., 2734.
 Schlaack, W., 1957.
 Schlegler, A. V., 1645.
 Schleiter, H., 3545.
 Schlottman, L. L., 3585.
 Schmahleisteig, R., 982.
 Schmid, D. O., 3761, 4159.
 Schmid, R., 2708.
 Schmidt, G., 596, 2743.
 Schmidt, K., 1637.
 Schmidt, L. H., 2145.
 Schmidt, P., 2733.
 Schmidt, U., 1818.
 Schmidtke, D., 3697.
 Schmidtke, H.-O., 3697.
 Schmiterlöw, C. G., 2046.
 Schmitt, J., 1190.
 Schmittidiel, E., 3267.
 Schneider, N. J., 1442, 2912.
 Schnelle, W., 2163.
 Schöberl, A., 3380.
 Schoenmakers, A., 3688.
 Schofield, B. M., 2015, 3798.
 Schole, J., 3068.
 Scholten, T. H., 3978.
 Scholtissek, C., 2952.
 Scholz, H.-D., 626, 1361.
 Schoop, G., 1392.
 Schotman, A. J. H., 2270.
 Schraufstätter, E., 1165.
 Schreiter, M., 1988.
 Schrickler, R. L., 3526.
 Schrinner, E., 3512.
 Schroeder, R. J., 1575.
 Schubert, J. R., 1570, 3349.
 Schuchardt, L. F., 2874.
 Schützler, G., 1670, page 235.
 Schuhardt, V. T., 3511.
 Schulman, J., 3951.
 Schulte, F., 1361.
 Schultz, G. A., 3535.
 Schultze, M. O., 1933.
 Schulz, A. R., 2375.
 Schulz, E., 3009.
 Schulz, J. A., 218.
 Schulz, K. C. A., 1427.
 Schulz, L.-C., 1980, 2061, 3368, 3721.
 Schulze, P., 732.
 Schulze, W., 872.
 Schumann, H., 578.
 Schwabe, C. W., 2615.
 Schwarz, H., 19, 2045.
 Schwarz, J., 380.
 Schwarz, J., 667, 1764, 3541.
 Schweckendiek, O. E., 731, 1788.
 Schweinburg, F. B., 1352.
 Schwerin, K.-O., 337.
 Schwöbel, W., 2157, 3943.
 Schiarra, D., 3259.
 Scott, G. R., 755, 1114, 1117, 1460, 2534, 3588, 3972.
 Scott, H. M., 192.
 Scott, M. G., 2271.
 Scott, M. L., 89, 865.
 Scott, M. T., 1856.
 Scott, P. P., 2271, 2272.
 Scott, T. W., 2741.
 Scratcherd, T., 1301.
 Seamer, J. J., 3609.
 Sears, T. A., 4142.
 Seastone, C. V., 1400, 1401.
 Sehek, Z., 2889, 3181, 3525.
 Sebrunns, M., 1621.
 Seekles, L., 2288.
 Seelmann, M., 345, 2088.
 Seeliger, H. P. R., 3072.
 Seeman, J., 389.
 Seifner, W., 656, 762.
 Shone, D. K., 1008.
 Segretain, G., 3195.
 Segura, M., 3572.
 Seibert, F. B., 2810.
 Seibold, H. R., 734, 2865.
 Seibutis, L., 3677.
 Seidel, H., 629, 1897, 3521.
 Seiden, R., 3457, page 432.
 Seidlitz, P., 712.
 Seifert, E., 3570.
 Seifert, H., 1914, 3843.
 Seils, H., 490.
 Sekariah, P. O., 1410, 2100, 2148, 2431.
 Sellers, A. F., 1274, 2346.
 Sellers, T. F., Jr., 3951.
 Sellwood, E. H. B., 3348.
 Selye, H., 185.
 Semellini, L., 597.
 Semenov, L. P., 922.
 Semenuta, A. T., 1906.
 Sen, A. B., 468, 1078.
 Sen, H. G., 2189.
 Senk, L., 2175.
 Sergeev, V. A., 399.
 Serres, H., 2187.
 Serý, V., 1717.
 Setchell, B. P., 194, 3731, 4076.
 Setka, R., 1120, 1800.
 Settergren, I., 3808.
 Sevoian, M., 2569, 2573.
 Sewell, I. A., 1272.
 Seymour, W. R., 682.
 Shaffer, C. B., 2318, 2981.
 Shah, H. L., 4025.
 Shakhova, T. V., 200.
 Shalkop, W. T., 821.
 Shand, A., 2950.
 Shanta, C. S., 3482.
 Sharma, A., 2364.
 Sharma, R. M., 1154.
 Sharman, G. A. M., 189, 4077.
 Sharman, I. M., 1214, 4083.
 Sharov, V. A., 2817.
 Sharp, D. G., 3950.
 Sharp, N. C. C., 822, 1183, 2996, 3658.
 Sharpless, G. R., 1551, 2204.
 Shaw, F., 146.
 Shaw, I. G., 946, 1088.
 Shaw, J. C., 505, 2289.
 Shawver, C. V., 1558.
 Shchavinskii, O. I., 2137.
 Shcheglov, A. M., 2294.
 Shcherbak, Y. N., 1366.
 Shchureskii, V. E., 2816.
 Shear, M. J., 1402.
 Sheffy, B. E., 1477, 1481, 3969.
 Shelley, H. J., 940.
 Shelley, W. B., 4206.
 Shelton, D. C., 4138.
 Shepard, C. C., 663.
 Sheppard, N., 527.
 Sher, D. W., 3783.
 Sheridan, B. W., 3941.
 Sherman, M., 915.
 Sherman, W. O., 4063.
 Shestak, S. S., 365.
 Shestochenko, M. A., 137.
 Shettles, L. B., 281.
 Shevtsova, N. I., 4163.
 Shibata, T., 751, 1113.
 Shields, G. S., 2281, 2282.
 Shifrine, M., 3917.
 Shiga, K., 182.
 Shikhobalova, N. P., 2625, 2788, page 300.
 Shimbayashi, K., 182, 183.
 Shimizu, H., 4180.
 Shimizu, K., 3213.
 Shimizu, T., 72, 74, 2526, 3966, 3967.
 Shimizu, Y., 775, 2560.
 Shilpov, V. S., 3998.
 Shishkov, N., 369.
 Shitov, K. A., 662.
 Shively, J. N., 4102.
 Shkonde, E. I., 2409.
 Shkurko, E. D., 3468.
 Shlyakhov, E. N., 1819.
 Shmidov, P. N., 538.
 Shnitser, V. I., 2137.
 Shoffner, R. N., 4189.
 Shokelr, A. A., 3428.
 Shone, D. K., 3060, 3499, 3868, 3996, 3937.
 Short, B. F., 3013.
 Short, R. V., 288, 1638, 2763.
 Shortridge, E. H., 3304.
 Shotts, E. B., Jr., 1046.
 Shrimpton, D. H., 1288.
 Shroft, I. G., 1813.
 Shubin, V. A., 1411.
 Shukla, R. R., 2100, 2148.
 Shul'ts [Schulz], R. S., 2788, page 300.
 Shuman, R. D., 1005, 1693.
 Shutyaev, N. A., 76.
 Shutze, J. V., 3778.
 Sibald, S., 3654.
 Sibalim, M., 3606.
 Sieburth, J. M., 1025.
 Siefert, V., 2157.
 Siegel, H., 3857, 3858.
 Siegmann, O., 836, 1082, 1873.
 Sielicka, B., 2880.
 Siennicki, W., 66.
 Sier, A. M., 1464.
 Sigurdsson, B., 425.
 Sikes, D., 1342.
 Siller, W. G., 1197, 1247, 2307.
 Silver, M., 3417.
 Silverman, P. H., 1183, 4022.
 Silverman, S. J., 3147.
 Silverstein, E., 1930.
 Silvestri, G. R., 3752.
 Simco, J. S., 2597.
 Simek, L., 2667.
 Simeone, D. H., 2415.
 Simeson, M. G., 2688.
 Simintzis, G., 1839.
 Simkiss, K., 4155.
 Simmons, G. C., 1408.
 Simms, B. T., 1528.
 Simon, J., 1353.
 De Simon, M., 3248.
 Simonnet, H., 3684, 3828, page 300.
 Simpson, J. K., 2730.
 Simpson, R. M., 3453, 3972, page 562.
 Sims, R., 413.
 Simunek, J., 2641.
 Simcher, H. J., 1610.
 Sinclair, A. N., 1513, 4015.
 Sinclair, K. B., 1565.
 Singer, E., 3845.
 Singer, S., 333.
 Singh, C. M., 2819.
 Singh, S. B., 3866.
 Singleton, A. G., 2347.
 Sinha, K. P., 1945.
 Sinha, P. K., 814.
 Sinha, S. K., 2561.
 Sirbu, Z., 1152, 1248.
 Sittmann, K., 3104.
 Sizaret, P., 130, 2946.
 Skaggs, J. W., 2797.
 Skalka, B., 2062.
 Skamser, L. M., 692.
 Skeggs, H. R., 1909.
 Skerman, K. D., 2287, 4073.
 Skinner, H. H., 1435.
 Skoda, R., 3256.
 Skold, B. H., 3046, 3701.
 Skovgaard, N., 178.
 Skowronski, Z., 3530.
 Skripkina, N. A., 376.
 Skrijabin, K. I., 2788, page 300.
 Skryabin, K. I., 2255.
 Skulberg, A., 2106.
 Slade, J. H. R., 459.
 Slagsvold, P., 2020.
 Slavin, A. M., 564.
 Slavin, D., 2140.
 Sleight, S. D., 2098, 2867, 3889.
 Sleith, F. St. G., 464.
 Slen, S. B., 2865, 4093.
 Slesarenko, V. V., 1366.
 Slesinger, L., 2462.
 Sloan, J. E. N., 2993.
 Slowitsky, Z., 3016.
 Smetana, M., 889.
 Smallfield, P. W., 2394.
 Smart, K. M., 3233.
 Smirnov, F. H., 231, 232, 233.
 Smirnov, I. I., 557.
 Sm't, J. D., 1536.
 Smit, T., 2521.
 Smith, A. G., 352.
 Smith, A. N., 3177.
 Smith, A. W., 3667.

- Smith, C. E. G., 104, 2868, 2876.
 Smith, C. T., 146.
 Smith, E. E., 1573.
 Smith, E. L., 593.
 Smith, G. R., 632, 1697, 2433.
 Smith, H., 4082.
 Smith, H. A., 3822.
 Smith, H. V., 219.
 Smith, H. Williams, 5, 999, 1017, 1712, 3918.
 Smith, I. D., 1926, 2495, 2496, 4147.
 Smith, I. M., 983, 2599.
 Smith, J., 4018.
 Smith, J. M. B., 671.
 Smith, J. P., 917.
 Smith, J. V., 1796.
 Smith, K. M., 2401, page 300.
 Smith, K. O., 3950.
 Smith, R. E., 2664.
 Smith, R. H., 2737, 3694, 4079.
 Smith, R. N., 3028.
 Smith, R. N., 225, 2035, page 52.
 Smith, S. E., 3625.
 Smith, V. R., 175.
 Smith, W., 1223, 2934, 4161.
 Smith, W. W., 3838.
 Smithburn, K. C., 2918.
 Smollich, A., 2038, page 235.
 Smuckler, E. A., 3742.
 Smyth, H. F., Jr., 1943.
 Smythe, R. H., 601, 4216, page 300.
 Snell, V. N., 665.
 Snoeck, G., 1350.
 Snoeyenbos, G. H., 2210.
 Snowdon, W., 1463.
 Snowdon, W. A., 3589.
 Snyder, W. W., 3392.
 Soave, O. A., 1133, 2914, 3977.
 Sobiech, T., 1747.
 Sokko, A. I., 426.
 Sobrero, L., 1739.
 Sobrero, R., 1163.
 Sochard, M. R., 2074, 2075.
 Söderlind, O., 2108.
 Soekawa, M., 122.
 Soeratio, 3872.
 Sørensen, P. H., 558, 3736.
 Sofrenović, D., 4049.
 Soika, W. J., 3160.
 Sokol, F., 2960.
 Sokolic, A., 4049.
 Sokoloff, L., 1930.
 Sokolova, I. B., 2613.
 Solana Alonso, A., 2487.
 Soliman, M. K., 3816.
 Solién, P., 2744.
 Solimitchi, A., 4098.
 Solomkin, P. S., 1918.
 Solomon, G. C., 1109.
 Soloshenko, I. Z., 71, 2101.
 Solotorovsky, M., 3857, 3858.
 Solov'ev, N. N., 1873.
 Solov'ev, S. I., 652.
 Soltyz, M. A., 2427.
 Sommerer, M., 3561.
 Sommerville, R. I., 1172.
 Sonoda, M., 931.
 Sonrinnov, F. F., 1173.
 Sorai, P., 1225, 1640.
 Sorensen, D. K., 1239.
 Sorina, S. E., 3161.
 Sosinatov, G. V., 3646.
 Sosn'sh, E. J. L., 155, 1544, 3306.
 Sourander, P., 3568.
 Southcott, W. H., 2637.
 D'Souza, B. A., 2834.
 Sova, Z., 171.
 Snaar, F. W., 168.
 Snadint, H., 2052.
 Snejz, A., 3343.
 Snelatin, J., 2173.
 Snar, I. L., 1194.
 Spector, W. G., 1945, 3740.
 Sneer, V. C., 3631, 3687.
 Spence, J. B., 1244.
 Spence, L., 2522.
 Spertzel, R. O., 1798.
 Snesiltseva, N. A., 3548, 3552.
 Spickard, W., 213.
 Spickett, S. G., 2960.
 Spiesz, S., 1792.
 Spink, M. S., 339.
 Spink, W. W., 3494.
 Spisni, D., 307.
 Spörri, H., 521.
 Spooner, E. T. C., 1066.
 Spratling, F. R., 4083.
 Sprent, J. F. A., 2647.
 Springer, D., 1657.
 v. Sprockhoff, H., 2120, 3264.
 Squibb, R. L., 2950, 3857, 3858.
 Srebočan, V., 465.
 Srivastava, H. D., 814.
 Stähli, W., 579.
 Staelens, M., 1711.
 Stahmann, M. A., 1400, 1401.
 Stakhanova, V. M., 1450.
 Stamatovich, S., 1196.
 Stamp, 2041.
 Stamp, J. L., 1223, 3832, page 562.
 Stampa, S., 2639, 3282.
 Stanca, M., 3228.
 Stancu, D., 234.
 Standen, A. C., 2044.
 Standen, O. D., 1181.
 Stanić, I., 3909.
 Stanier, R. Y., 3826, page 432.
 Stansbury, R. E., 1156.
 Stanton, M. F., 2703.
 Stanworth, D. R., 974.
 Starovoitov, A. M., 258.
 Starr, T. J., 449, 790, 1825.
 Stasilevich, Z. K., 2078.
 Stearman, R. L., 2418.
 Stebbins, M. R., 774.
 Steel, J. D., 1969.
 Steele, J. H., 1322, 2166.
 Steffen, J., 2417.
 Stehbens, W. E., 1925.
 Steigman, A. J., 2587.
 Steiner, J. W., 797, 3759.
 Steinhoff, G., 3091.
 Steinberg, H., 3158.
 Stenius, P. I., 1799.
 Stepanenko, N. D., 3146.
 Stepankina, M. K., 1613, 1615.
 Stepanova, N. I., 3565.
 Stephen, J., 3894.
 Stephen, L. E., 695, 1418, 2889, 3556.
 Stephens, J. F., 1773.
 Stern, D., 146.
 Sternberg, S. S., 839, 840.
 Sterne, M., 1750.
 Stevens, A. G. W., 1896.
 Stevens, A. J., 1244, 3713.
 Stevens, C. E., 1274, 2346.
 Stevenson, D. E., 3006.
 Stevenson, G. T., 1776.
 Stewart, C. J., 1332.
 Stewart, D. L., 403, 3942.
 Stewart, G. T., 537.
 Stierlin, H., 47, 48, 1021.
 Stietenroth, H., 2735.
 Stillinović, Z., 3763.
 Stirling-McGee, M., 1692, 2860.
 Stober, M., 3957.
 Stoddard, H. L., 3711.
 Stöckl, W., 615, 1930, 2052.
 Stoenner, H. G., 33, 3998.
 Stoican, E., 1159, 2985.
 Stojev, P., 3308.
 Stoković, M., 990.
 Stoker, M., 2577.
 Stokstad, E. L. R., 1777.
 Stokhikov, E. P., 2856.
 Stoll, L., 325, 358.
 Stolyarova, A. L., 231, 232, 233.
 Stone, B. F., 1521.
 Stone, G. M., 2379.
 Stone, H. D., 2202.
 Stone, R. E., 3336.
 Stone, S. S., 1115, 1459, 2923, 2943.
 Stormshak, F., 2372.
 Storr, G. M., 2778.
 Storry, J. E., 4065, 4166, 4167.
 Storz, J., 1122.
 Stout, F. M., 186.
 Stowe, C. M. Jr., 4144.
 Strachan, N. H., 3358.
 Strähli, P., 844.
 Strasser, H., 223.
 Straub, C. P., 2749.
 Straub, M., 667, 3541.
 Straub, O. C., 181, 1122.
 Strauch, D., 1731.
 Straus, E. K., 2591.
 Strauss, J., 1717.
 Strawbridge, H. T. G., 623.
 Strehl, W., 812.
 Strobbe, R., 1437.
 Ström, B., 3434.
 Strohmaier, K., 1098.
 Strojna, S., 2449.
 Stromberg, M. W., 2310.
 Strong, F. M., 2324.
 Strong, J. P., 3644.
 Strufe, R., 1167.
 Stuart, A. E., 977, 3466.
 Stuart, E. E., 1084.
 Stubenrauch, L., 3719.
 Studdert, M. J., 3241.
 Stützel, M., 3356.
 Stukonozhenko, P. I., 1626.
 Stula, E. F., 2804.
 Stupak, N. F., 3709.
 Sturkie, P. D., 4160.
 Styczynski, H., 2666.
 Suarez-Soto, M., 1299.
 Suassuna, I., 2437.
 Suassuna, I. R., 2437.
 Suchkov, Y. G., 135, 1510.
 Sudsaneh, S., 4163.
 Suganuma, Y., 1363, 2604.
 Sugimura, K., 955.
 Sugiura, K., 1160.
 Suhaci, I., 2957.
 Suitor, A. E., 3339.
 Sula, L., 1335.
 Sulitzeanu, D., 3885.
 Sulkis, S. E., 413.
 Sullivan, D. J., 166, 963.
 Sultz, B. M., 3835.
 Summerville, W. A. T., 3445.
 Suntsava, T. S., 3475.
 Supper, R., 154.
 Supplee, W. C., 3020.
 Surdan, C., 430, 2907.
 Surján, J., 70, 1790.
 Sury, A., 2545.
 Surynek, J., 2250.
 Suskind, S. R., 44.
 Sutherland, D. N., 1647.
 Sutherland, G. B., 795.
 Sutherland, I. B., 3471.
 Suttmöller, P., 2754, 4071.
 Suwa, T., 676, 677.
 Suzuki, K., 26, 1089, 2579.
 Suzuki, M., 2515.
 Suzuki, T., 2125.
 Svanbaev, S. K., 700.
 Svarc, R., 2645.
 Svendsen, R., 291.
 Swahn, O., 432, 2077.
 Swangard, W. M., 2193.
 Swanson, L. E., 1184, 1588, 2247.
 Swarbrick, O., 4129.
 Sweeney, E. E., 2803.
 Swenson, M. J., 4133.
 Świątliński, M., 1543.
 Switzer, W. P., 2191.
 Swoboda, R., 1191.
 Sword, C. P., 3488.
 Sykes, J. F., 1356, 1558, 2373, 3014.
 Symington, R. B., 1596, 3074.
 Symons, L. E. A., 1542, 2621.
 Symons, R. H., 201.
 Syverton, J. T., 680.
 Szabó, E. B., 4153.
 Szabó, I., 3223.
 Szabó, J., 469.
 Szabó Szűcs, J., 3225, 3226.
 Szafarski, J., 2551.
 Székely, A., 1257, 1702.
 Szemberowa, M., 1137.
 Szemerédi, G., 2099.
 Szent-Györgyi, A., 3679.
 Szent-Iványi, T., 124, 610.
 Szidon, A., 1701.
 Szokoloczy, I., 3026.
 Szumowski, P., 2001.
 Szurman, J., 2939, 3252.
 Szwejkowski, H., 3004.
 Tabuchi, K., 2125.
 Tados, G., 3559.
 Tados, M. M., 1458, 3520.
 Taffs, L. F., 1871.
 Taga, L., 1138.
 Taglia, L., 3259.
 Tajima, Y., 2416, 2579.
 Takahashi, Y., 2814.
 Takamura, M., 2455.
 Takanami, M., 3163.
 Takatori, I., 1134.
 Takehara, Y., 819.
 Taketa, F., 2725.
 Takeuchi, S., 4180.
 Takeya, K., 819.
 Talbot, L. M., 1595.
 Tallis, G. M., 1627.
 Talwalker, P. K., 1967.
 Tamarin, R., 998, 3480.
 Tamm, I., 2954.
 Tammemagi, L., 1900.
 Tamura, T., 2361.
 Tanaka, T., 2416, 3875.
 Tanami, Y., 790, 1825.
 Taneja, G. C., 4146.
 Taneno, H., 2516.
 Tanga, G., 3613.
 Tani, A., 1372.
 Taniguchi, H., 2514.
 Tapernoux, A., 2598.
 Tarkiewicz, S., 1745.
 Tarocco, C., 169.
 Tarshis, I. B., 2592.
 Tashenov, K. T., 1605, 1606, 1614.
 Tatarov, B., 2090, 3908.
 Tavares Montano, L. A., 2655.
 Taylor, C. E. D., 2837.
 Taylor, C. R., 1896.
 Taylor, E. L., 473, 3805.
 Taylor, G. C., 3881.
 Taylor, J., 640, 2071, 3153.
 Taylor, J. C., 3035.
 Taylor, J. H., 2368, 2369, 4082.
 Taylor, J. I., 3109.
 Taylor, J. R. E., 2571.
 Taylor, M. J., 2807.
 Taylor, P. F., 129.
 Taylor, P. J., 2569.
 Taylor, R. L., 3596.
 Taylor, W., 1301.
 Tchilev, D., 2090.
 Tee, G. H., 3500.
 Tehlár, F., 1823.
 Tejerina, G., 918.
 Tello G. A., 1362.
 Temin, H. M., 2212.
 Temper, K., 3145.
 Templeton, W. L., 2747.
 Tendetnik, Y. Y., 1173.
 Tepper, I., 1101.
 Terlecki, S., 1243.
 Ternovoi, V. I., 3633.
 Ter-Pogossian, M., 211.
 Terpstra, J. I., 889, 2180.
 Terrill, J. G., 2749.
 Terry, R. J., 1183.
 Teruykhanov, A. B., 1128.
 Terzin, A. I., 2581.
 Tesink, J., 499, 620.
 Teunissen, G. H. B., 2314.
 Teute, H. W., 1724, 3460.
 Tewari, A. N., 2986.
 Textor, K., 4160.
 Te-Yong Lou, 1455.
 Thafvelin, B., 1946, 3334.
 Thal, E., 207.
 Thamm, H., 447.
 Thatcher, F. S., 2877.
 Theilen, G. H., 2263.
 Thérét, M., 2680.
 Thiel, W., 616.
 Thienont, D., 674, 739, 1471, 2884.
 Thiéry, G., 678, 1622, 2127, 2161, 2517, 2518, 3949.
 Thün, J. W., 3447.
 Thomas, A. J., 4120.
 Thomas, B., 497.
 Thomas, C. A., 44.
 Thomas, E. D., 2297.
 Thomas, J., 2582.
 Thomas, J. A., 3216.
 Thomas, J. B., 912, 1061.
 Thomas, J. L., 1112.

- Thomas, J. W., 3014.
 Thomas, L. A., 749.
 Thomas, M., 2802.
 Thomas, R. J., 2638.
 Thomas, S. B., 2078.
 Thomas, W. D., 5108.
 Thomason, E. L., Jr., 1899.
 Thomason, J. B., 1321.
 Thomlinson, J. R., 1018.
 Thompson, C. O. M., 2593.
 Thompson, D. E., 1855.
 Thompson, J., 2391.
 Thompson, R. H., 1566, 4114.
 Thompson, R. H. S., 1936.
 Thomsen, R. N., 3363.
 Thomson, A., 1053, 3893.
 Thomson, A. R., 1609.
 Thomson, E. O., 654.
 Thonn, S., 1004.
 Thoonen, J., 892, 3254, 3365.
 Thormar, H., 425, 1475.
 Thorne, A. L. C., 1135.
 Thorne, H. V., 1785.
 Thorpe, W. T. S., 565.
 Thorpe, W. H., page 686.
 Thorsell, W., 1601, 3469.
 Threlfall, G., 4120.
 Thuillie, M.-J., 3731.
 Tican, V., 2906, 2908.
 Tiga, N. N., 886.
 Tigertt, W. D., 1738, 2523.
 Till, D. H., 1593.
 Tillotson, A. J., 1185, 4119.
 Timmerman, J. A., Jr., 1992, 4046.
 Timoney, J. F., 1705.
 Timoshkin, Z. P., 2326.
 Tindal, J. S., 3760, 3819, 4158.
 Titus, H. W., 909.
 Titus, I., 324.
 Tkalic, A. I., 526.
 Tobe, S. B., 2407.
 Tobie, E. J., 2891.
 Tobie, J. E., 2982.
 Toda, T., 319.
 Todd, A. C., 1867, 2626, 3312, 3934.
 Todd, F. A., 3055.
 Todd, J. R., 1249, 1566, 3691, 4114.
 Todorov, A., 284.
 Todorović, L., 1848.
 Tölgyesi, G., 241, 1692, 2329.
 Tokarnia, C. H., 3321, 4090, 4124, 4125, 4126.
 Tolle, A., 3011.
 Tolnal, S., 489.
 Tolstova-Parliskaya, N. G., 2294.
 Tománek, J., 3698.
 Tomar, N. S., 3418.
 Tomáš, J., 2736.
 Tomecka, N., 1134.
 Tomesko, V., 2907.
 Tomizawa, K., 121.
 Tomlinson, A. R., 1624, 2563.
 Tompkins, V., 591.
 Topolnik, E., 418.
 Torbert, B. J., 1177.
 Torlone, V., 1545, 1816.
 Torpakov, F. G., 564.
 Torrey, J. P., 2938.
 Toscano, G., 544, 1286.
 La Touche, C. J., 1070.
 Tournier, P., 1489.
 Tournut, J., 2536.
 Tourtellotte, M. E., 2476, 3554.
 Townsend, G. F., 489.
 Tozzini, F., 763.
 Tracv, R. L., 230.
 Trafford, J. P., 535.
 Trainer, D., 3140.
 Trainer, D. O., 2951.
 Trainin, D., 1295, 1297.
 Trapani, R. J., 1402.
 Trapido, H., 780.
 Trap, A. L., 3953.
 Trautman, R., 2158.
 Trautman, R. J., 665, 818.
 Trautwein, G., 216, 770, 894.
 Trautwein, K., 3637.
 Travis, H. F., 4070.
 Trávníček, J., 2867.
 Trawińska, J., 1710, 1714.
 Trawiński, A., 1714.
 Traylor, M. A., 2979.
 Trbić, B., 2448, 3179.
 Trefogli, C., 2656.
 Trenchi, H., 1256.
 Trethowie, E. R., 2473, 2474.
 Tret'yakova, A. A., 357, 2853.
 Triantaphyllopoulos, D. C., 3405.
 Triau, R., 1004.
 Tribe, D. E., 1569.
 Trifunović, Z., 2323.
 Trimarchi, G., 3799.
 Trimberger, G. W., 1989, 1990.
 Trofimova, R. M., 1607, 1612, 1616.
 Trollender, H., 3769.
 Tromba, F. G., 830.
 Trotter, M. D., 3904.
 Trumić, P., 2451, 2484.
 Trunkát, J., 456, 1229.
 Truscott, R. B., 686.
 Trusczyński, M., 30.
 Tsaga, L., 3579.
 Ts'ai Fan Yü, 1978.
 Tselishchev, L. I., 3459.
 Tsirel'son, N. B., 1200.
 Tsolov, V., 2010.
 Tsubahara, H., 3229, 3232.
 Tsubura, E., 1764.
 Tsuchiyama, H., 1906.
 Tsur-Tchernomoretz, I., 1424.
 Tsuzuki, H., 2705.
 Tsvetaeva, N. P., 1863.
 Tsybal, A. M., 1837.
 Tucker, E. M., 2226.
 Tuffery, A. A., 2779.
 Tufts, J. M., 2197.
 Tugwell, R. L., 1773.
 Tuilner, W. W., 2377.
 Tunkl, B., 418, 2050.
 Turk, D. E., 1902.
 Turk, J. L., 2811.
 Turk, J. L., Jr., 867.
 Turk, R. D., 1178, 1179, 1180.
 Turlin, A. A., 2839.
 Turnbull, K. E., 3794.
 Turner, A. S., 1412.
 Turner, A. W., 2473, 2474.
 Turner, E., 1358.
 Turner, G. D., 1356.
 Turner, H. G., 1645, 4046.
 Turner, H. N., 2727.
 Turner, J. H., 821, 823, 1853, 1854, 2618.
 Turner, L. H., 2868, 2876.
 Turner, L. W., 3887.
 Turner, R. O., 1235, 3373.
 Turner, V., 465, 3640.
 Turton, J. D., 1461.
 Turudić, V., 3179.
 Tustin, R. C., 1756, 1939, 2713.
 Tverskov, G. B., 830.
 Twardowski, K., 3616.
 Tyler, C., 545, 2740.
 Tyler, W. J., 3792.
 Tyler, W. S., 3410.
 Ubertini, B., 727, 1440.
 Überreiter, G., 1882, 2311.
 Ueda, S., 8155.
 Ueno, H., 149, 1529, 2233.
 Ugrskli, L., 1375, 2449.
 Uhlig, H., 323.
 Uhlmann, W., 401, 402.
 Uhr, J. W., 142, 3270.
 Uilenberg, G., 1769.
 Ulberg, L. C., 2764.
 Ulbrich, F., 60, 2094, 3522.
 Ulberg, S., 1282.
 Ulberc-Olsson, K., 1390.
 van Olsen, F. W., 658.
 Ulyanov, D., 2248.
 Underberg, G. K. L., 243, 3893.
 Underdahl, N. R., 771, 2189, 2942.
 Unsworth, K., 8114.
 Unton, A. C., 900.
 Uraleva, V. S., 346.
 Urvah, H., 961.
 Urbaneck, D., 218.
 Urbaschek, B., 1032, 2852, 3637.
 Urist, M. R., 1231, 2734.
 Urquhart, G. M., 1183.
 Ursache, R., 3227.
 Ursiny, J., 2547.
 Urvölgyi, J., 3629.
 Uscavage, J. P., 3198.
 Ushijima, J., 2414.
 Usiskin, S. R., 2751.
 Usovsky, B. N., 2409.
 Usui, K., 1216.
 Uvarov, O., 1592, 3056.
 Uziębło, B., 3156.
 Vaccari, I., 597, 3563.
 Vacek, Z., 3400.
 Valentine, H. D., 1061.
 Valentine, R. C., 136, 1794.
 Valentinčić, S. I., 2292.
 Valeri, H., 3749.
 Vallée, A., 61, 78, 1091, 2498, 2543, 2544.
 Vallejo, L., 90.
 Vallejo, L. C., 3458.
 Valley, T. H., 1183.
 Valmont, I., 2726.
 Vanbreuseghem, R., 670.
 Vandemark, N. L., 3416.
 Vandeplasse, M., 642, 1350, 2769.
 Vandersall, J. H., 10.
 Vandervelden, M., 674, 1471.
 Vandesteene, R., 674.
 Vandiviere, H. M., 2810.
 Vandiviere, M. R., 2810.
 Varachiu, N., 3856, 4019, 4098.
 Vardaman, T. H., 622, 991, 2309.
 Varenika, D., 262.
 Varenne, H., 400, 2392.
 Varfolomeyeva, A. A., 1044.
 Varma, M. G. R., 1451.
 Varnagiris, A., 1648.
 Varnell, T. E., 175, 3765.
 Varyushin, V. Y., 317.
 Vasil', M., 421.
 Vasil'ev, N. T., 1549.
 Vasington, J. J., 1824.
 Vassilev, L., 475, 478.
 Vasudeva, R. S., 4215.
 Vaughan, J. B., 3947.
 Vaughan, L. C., 220.
 Vauris, R., 3537.
 Vavich, M. G., 1994.
 Veckenstedt, A., 95, 1097.
 Vega, A. E. M., 107.
 de la Vega D. E., 1462.
 Vegors, H. H., 826.
 Vellin'sh, E. I., 1924.
 Velle, W., 1636, 3427.
 Velling, G., 4099.
 Velvart, J., 3518.
 Venkataratnam, A., 1876.
 Venkataswami, V., 3419.
 Venturoli, M., 1241, 1895.
 Venzke, W. G., 2026.
 Verge, J., 603, 723, 1784, 3217.
 Verlinde, J. D., 388.
 Vermant, G., 2661.
 Vermeulen, C. W., 3677.
 Véron, M., 3148.
 Vershilova, P. A., 62, 347, 2097, 2863.
 Verts, B. J., 738.
 Verwoerd, D. W., 1748.
 Vetter, R. L., 2626.
 Věžník, Z., 2008, 2017.
 Věžníková, D., 126.
 Viallier, J., 2054.
 Vicard, A., 617.
 Vice, T. E., 1263.
 Vick, J. A., 839, 3494.
 Vickers, C. L., 912, 1061.
 Vickers, D. B., 3489.
 Vidler, B. O., 382, 1086, 3938.
 Vidone, L. B., 2318, 2981.
 Vierendeel, H., 2195.
 Vieu, J.-F., 41.
 Vieux, 2304.
 Villa, L. J., 107.
 Villalon, F., 303.
 Villee, O. A., 3121, page 432.
 Villemot, J.-M., 3201.
 Vinson, J. W., 3540.
 Vior, C., 442.
 Virat, B., 2543, 2544.
 Virat, J., 2498.
 Vischer, W. A., 2091.
 Vishnyakov, S. I., 2944.
 Vismara, E., 484.
 Vissac, B., 4157.
 Visscher, M. B., 3870.
 Vitale, J. J., 3692.
 Vitéz, I., 82.
 Vizzy, L., 70.
 Vláduťu, O., 4058.
 Vlček, Z., 2019.
 van Vloten, J., 316.
 van Vloten, J. G. C., 53.
 Vodrážka, J., 2642, 2643.
 Vogel, F. S., 3734.
 Vogt, H., 2322.
 Volcani, R., 3756, 3793.
 Vollhardt, Y., 1494, 2450, 3245.
 Voss, R. C., 866.
 Voss, U., 2194.
 Voukitchevitch, Z., 1749.
 Voüte, E. J., 3371.
 Vozarik, J., 421.
 Vražić, O., 1879.
 De Vries, A., 3617.
 Vrtiak, J., 1142, 2533, 3627.
 Vrtiak, O. J., 420, 1823, 2564.
 Vrzgula, L., 2422.
 Vuillaume, R., 1331, 2504.
 Vujić, B., 4043.
 Vukelić, A., 1732.
 Vukelić, E., 481, 1187, 1246.
 Vukičević, Z., 351.
 Vuković, V., 3130.
 Vu Thien Thai, 757.
 Vysotskii, B. V., 77.
 van der Waaij, D., 714.
 Wachendörfer, G., 2911, 3988.
 Wachnik, Z., 1147.
 Wade, A. E., 1146, 1538, 2247.
 Wade, J., 1639.
 Wagenaar, G., 885.
 Wagner, R. R., 11, 2172.
 Wagner, W. C., 287, 2014, 3890.
 Wahby, A. M., 34.
 Waheed Ahmed, 1292.
 Wainman, F. W., 928, 1597.
 Waisbren, B. A., 3493.
 Waite, R., 3113.
 Waite, G. M. H., 554.
 Waite, R. E., 145.
 Wakem, A. A., 2519.
 Walcher, D. N., 3995.
 Waldrup, P. W., 2144.
 Wales, R. G., 4187.
 Waletzky, E., 4044.
 Walker, C. A., 1264.
 Walker, D. F., 4036.
 Walker, D. G., 3414.
 Walker, D. J., 2481, 4076.
 Walker, E. A., 2368, 2369.
 Walker, F. C., 3632.
 Walker, F. F., 2990.
 Walker, F. G., 1982.
 Walker, J., 1066, 1396, 2709.
 Walker, J. H. C., 55.
 Walker, P. J., 2892.
 Walker, W. W., 3200.
 Walker, S. J., 3978.
 Wallace, H. D., 1207.
 Wallace, J. C., 3412.
 Wallbank, A. M., 492.
 Waller, F. J. A., 3936.
 Walley, J. K., 1183, 2244, 2630.
 Wallis, C., 3110.
 Wallmark, G., 3462.
 van der Walt, K., 3208.
 Walter, W. G., 1546, 1552.
 Walton, G. A., 2231.
 Walzl, H., 432.
 Wamberg, K., 209, 1761.
 Wangenstein, O. H., 2364.
 Wapler, P., 3477.
 Ward, A. A., Jr., 3853.
 Ward, D. N., 1639.
 Ward, G. M., 4133.
 Ward, P. A., 1708.
 Ward, P. F. V., 527.
 Ward, T. G., 2257.

- Wardrop, I. D., 3771.
 Warfield, M., 2927.
 Warfield, M. S., 3595.
 Warner, A. R., Jr., 4102.
 Warner, D. R., 855.
 Warner, R. G., 1278.
 Warnick, A. C., 950.
 Warren, F. L., 3414.
 Warren, J. V., 932.
 Warren, M. K., 3090.
 Wartenberg, L., 2722.
 Warwick, B. L., 576.
 Washewski, W. J., 1832.
 Washendörfer, G., 3988.
 Washko, F. V., 3963.
 Wasserman, R. H., 3094, 3374.
 Watanabe, M., 26, 63, 676, 677.
 Watanabe, S., 54, 109, 149, 1456, 1529, 2233, 2516, 3238.
 Watanabe, T., 269.
 Waters, N. F., 1826.
 Waterson, A. P., 2953.
 Watkins, J. R., 2480.
 Watson, J. W., 1655.
 Watson, K. C., 1594.
 Watson, R. B., 2768.
 Watson, R. H., 4192.
 Watson, R. L., 3592.
 Watson, W. A., 1087.
 Watt, J. A., 3655.
 Watt, J. A. A., 1223.
 Watt, J. G., 4115.
 Watt, L., 1420.
 Watts, P. S., 3093.
 Van Waveren, C. M., 644.
 Wawrzkievicz, K., 1341.
 Weatherall, J. A. C., 542.
 Weaver, E., 3392.
 Webb, H. E., 1451.
 van Weerden, E. J., 3775.
 Weidenmüller, H., 444.
 Weidlich, N., 3504.
 Weigle, W. O., 1834.
 Weil, C. S., 1943.
 Weil, M. H., 3154.
 Weimer, H. E., 648.
 Weiner, D., 2216.
 Weinman, D., 1092.
 Weins, D., 645.
 Weintraub, J., 2593, 2594.
 Weir, J. A., 3712.
 Weise, W., 502.
 Weiser, H. H., 862.
 Weiser, R. S., 777.
 Weiss, B., 4148.
 Weiss, E., 486, 903.
 Weiss, J. B., 976, 1981.
 Weiss, P., 2241.
 Weissenberg, I., 1424.
 Weissman, N., 2282.
 Weitz, B. G. F., 1417.
 Wejda, E., 3285.
 Welch, R. M., 4175.
 Wellmann, G., 827.
 Wells, G. E., 3936.
 Welsh, H. H., 2217.
 Welshimer, H. J., 627.
 Welter, O. J., 2804.
 Wemmenhove, R., 786, 884, 3974.
 Wende, N. M., 2900.
 Wende, R. D., 306.
 Wenner, H. A., 452, 771, 1455, 1487.
 Wensinck, F., 2436.
 Wensvoort, P., 887.
 Wenzel, S., 2446.
 Werder, A. A., 771, 1487.
 Werner, H., 712, 713.
 West, B., 1822, 2981.
 West, L. C., 1938.
 Westerlund, A., 1208.
 Westermarck, H., 2681.
 Westhues, M., 979, 2037, page 235.
 Westpfahl, U., 4183.
 Westphal, O., 47, 48, 1021.
 Westphal, W., 1723, 3139.
 Wettimuny, S. G. De S., 471.
 Weyland, H., 1653.
 Weżyk, S., 2712.
 Wheat, J. D., 575.
 Wheeler, D. W. F., 3900.
 Wheatley, V. K., 3783.
 Wheeler, H. G., 804.
 Wheelock, E. F., 2954.
 Whelan, M. A., 687.
 Whenham, G. R., 2464, 2751.
 Whipple, G. H., 193.
 Whitby, J. L., 3538.
 White, F., 3122.
 White, G., 3972.
 White, I. G., 2741, 3412, 4187.
 White, L. E., Jr., 3853.
 White, P. J., 3234.
 White, R. R., 3932.
 Whitehead, G. B., 2230.
 Whiteman, C. E., 1466.
 White-Stevens, R. H., 1777.
 Whiting, F., 2665.
 Whitlock, L. E., 1969.
 Whitmore, G. E., 1853, 1854, 1855.
 Whitney, L. F., 1633.
 Whitten, L. K., 3304.
 Whittow, G. C., 4145.
 Widdicombe, J. G., 4171.
 Widdowson, E. M., 1555.
 Wide, L., 283.
 Wiegand, D., 60, 3522.
 Wiersema, J. P., 886.
 Wiggins, G. S., 1533.
 Wight, P. A. L., 1802.
 Van den Wijngaert, M., 1850.
 Wikerhauser, T., 465, 467, 806, 2232, 3643.
 Wilcox, C. J., 3439.
 Wilder, O. H. M., 3335.
 Wildy, P., 2577.
 Wilkins, J. H., 4140.
 Wilkins, M. P., 2071.
 Wilkinson, P. R., 1520, 3281.
 Wille, H., 168.
 Willems, R., 2151.
 Willers, E. H., 3544.
 Willett, K. C., 3919.
 Willham, R. L., 2296.
 Williams, F. P., Jr., 792.
 Williams, G., 3440.
 Williams, H. E., 97.
 Williams, J. A., 2098, 2364, 3095.
 Williams, L. W., 1558.
 Williams, M. C., 3065.
 Williams, R. E. O., 3839.
 Williams, R. P., 2419.
 Williamson, J., 695, 2889.
 Willinger, H., 68.
 Willis, A. T., 1056.
 Willis, R. A., 2787.
 Wills, F. K., 3008.
 Wilson, A. L., 866.
 Wilson, A. P., 983.
 Wilson, C. D., 2796.
 Wilson, E. M. J., 2439.
 Wilson, G. I., 821, 823, 2618.
 Wilson, J. B., 1401.
 Wilson, J. E., 618, 2140.
 Wilson, J. H. G., 625, 1865.
 Wilson, J. M., 1642.
 Wilson, P. N., 3757.
 Wilson, R. A., 4077.
 Wilson, T., 3318.
 Wilson, W. O., 4149.
 Wilthbank, J. N., 2873.
 Winkler, K. C., 793.
 Winn, J. F., 2217.
 Winsser, J., 3867.
 Winter, A., 2951.
 Winter, A. J., 1353, 1354, 1355.
 Winter, A. R., 862.
 Winter, H., 2306.
 Winterheld, R. W., 788.
 Winterhalter, M., 3641.
 Wintrobe, M. M., 2281.
 Wintzer, H. J., 226.
 Wiseman, R. F., 371.
 Wisniewski, J., 310.
 Wisniewski, J., 3507.
 Witebsky, E., 1514.
 Withers, F. W., 1574.
 Witter, L. D., 1954, 2866.
 Wittmann, G., 725, 3997.
 Witznitzer, T., 1351, 1352.
 Wodzicka, M., 250.
 Wodzicka-Tomaszewska, M., 3794.
 Wölk, B., 4003.
 Woernle, H., 446, 1503, 3618, 3624.
 Wogan, G. N., 3857, 3858.
 Wolf, B., 2089.
 Wolfe, H. R., 457, 1831, 2588.
 Wolfe, P. A., 3045.
 Wolff, E., 101.
 Wolff, J. W., 653, 1042.
 Wolin, M. J., 938.
 Wolle-John, R., 52.
 Wołoszyn, S., 1798.
 Wolstenholme, G. E. W., page 686.
 Wong, D., 2927.
 Wood, A. J., 4204.
 Wood, I. B., 4044.
 Wood, J. C., 2993.
 Wood, R. K. S., 2794, page 300.
 Wood, S. R., 3904.
 Woodcock, J. G., 230.
 Woodroffe, G. M., 440, 1106.
 Woods, W. D., 193.
 Woods, W. R., 855.
 Woodside, M. W., 1943.
 Woodward, K. T., 4102.
 Woodworth, H. C., 1092.
 Wooldridge, W. R., 595.
 Work, T. H., 780.
 Worker, N. A., 1949.
 van der Wouden, M., 3209.
 Wrich, M. J., 801.
 Wright, A., 923.
 Wright, A. E., 3560.
 Wright, A. I., 4117.
 Wright, G. G., 2418.
 Wright, H. B., 123.
 Wright, J. F., 3395.
 Wright, M. A., 2265.
 Wright, M. L., 2471, 3903.
 Wright, P. A., 1891.
 Wright, W. W., 1261.
 Wünsche, H.-G., 1623.
 Wuest, E. C., 831.
 Wupper, O., 1029.
 Wurzinger, H., 2693.
 Wyant, Z. N., 1860, 4029, 4030.
 Wyllie, J. C., 3978.
 Xalabarder, C., 1687.
 Yadava, I. S., 3328.
 Yaeger, R. G., 373.
 Yager, R. H., 1738.
 Yagi, Y., 794.
 Yakovleva, L. A., 3723.
 Yamamoto, K., 3478.
 Yamano, T., 63.
 Yamashita, T., 2353.
 Yanagawa, R., 72, 74.
 Yanchenko, M. K., 346.
 Yang, M. G., 242.
 Yaoi, H., 2527.
 Yarborough, J. H., 3319.
 Yarinsky, A., 3897.
 Yasarol, S., 816.
 Yashchinski, B., 756.
 Yasin, S.-A., 716.
 Yates, V. J., 2203, 2572, 2576.
 Yeast [Keast], J. C., 1588.
 Yeck, R. G., 244.
 Yeo, D., 3284.
 Yokohori, H., 2060.
 Yonemura, T., 182, 183.
 York, C. J., 2535, 3970.
 Yoshida, N., 1372.
 Yoshida, T., 676, 677.
 Yoshino, K., 2514, 2515.
 Yotis, W. W., 608, 1673.
 You-Ling Fan, 639.
 Youmans, A. S., 1328.
 Youmans, G. P., 1328.
 Young, F. G., 3355.
 Young, G. A., 2139, 2942.
 Young, J., 2634.
 Young, L., 1317.
 Young, R. J., 968.
 Young, S., 2259.
 Young, S. S. Y., 1627.
 Young, V. M., 2074, 2075.
 Yuskovets, M. K., 2028.
 Zach, B., 560.
 Zadura, J., 118.
 Zaharija, I., 336, 350.
 Zahran, G. E. D., 717, 3574.
 Zaitsev, A. G., 3182.
 Zaitseva, A. I., 2095.
 Zajfcek, D., 1862.
 Zák, F., 1335.
 Zakamyrdin, I. A., 4011, 4012.
 Zaki, O. A., 34.
 Zakiewicz, M., 8443.
 Zakopal, J., 108.
 Zanella, A., 375, 3558.
 Zanetti, M., 1752.
 Zangwill, O. L., page 686.
 Zaphiro, D., 2185.
 Zavagli, V., 398.
 Zebrowski, L., 3950.
 Zeibel, H. G., 1777.
 Zellat, J., 2538.
 Zeller, R., 217.
 Zeman, J., 126.
 Zemanis, R., 1050, 1057.
 Zendulka, M., 1870.
 Žeskov, B., 222, 481, 1187.
 Zetl, K., 406, 1727.
 Zhelev, V., 1326.
 Zhemkova, Z. P., 2356.
 Zhuravlev, V. V., 3864.
 Zhurnakova, M. A., 1734.
 Zimbelman, R. G., 3099, 3100, 3792.
 Zimmer, E. A., 579.
 Zimmermann, B., 4059.
 Zimmermann, G., 240, 2119.
 Zimmermann, W. J., 4039.
 Zinca, S., 1188.
 Zinn, R., 1322.
 Zinn, R. D., 2797.
 Zinneman, H. H., 1038, 2447.
 Zinober, M. R., 2938.
 Zioto, T., 1845.
 Zivkovitch, V., 462.
 Zmoray, I., 2645.
 Zotov, A. P., 3041.
 Zubareva, L. A., 1649.
 Zuffa, A., 1006, 3256.
 Zuković, M., 467, 1187.
 De Zulian, V., 987.
 Zuliński, T., 120, 3047.
 Zuseck, F., 2193, 3959.
 Zuur, P. J., 1760.
 van Zwaneberg, D. F., 1332.
 Zwart, P., 63, 203.
 Zwillenberg, H. H. L., 4150.
 Zwolski, W., 343.

SUBJECT INDEX

- ABATTOIRS** Contamination with salmonella, 2083.
ABOMASUM see Digestive system, ruminant digestion.
ABORTION, GENERAL
 Cows Of unknown cause, 286; anthrax, 609; vibronic, 656; listeria and salmonella, 658; epidemic abortion in California, 1121-2; causes of abortion in Victoria, 1398; prevention by vitamin E, 1957; causes of abortion in Germany, 2113; leptospiral, 2453; causes in Belgium, 2582; abortifacient lipopolysaccharide from Br. abortus, 2852.
 Other animals Caused by Malucidin in bitch, ewe and cat, 1633; in ewes, 763; 1377; toxoplasma in ewes, 1087; 2497; leptospira in sows, 2099; 3180; Aujeszky's disease in sows, 3223.
ABORTION, EQUINE VIRUS Virulence of the virus, 110; neutropism in lab. animals, 753; hepatitis in hamsters, 754; during influenza outbreak, 1798; rhinopneumonitis in Switzerland, 2526; equine abortion in U.K., 3587.
ABORTION, OVINE VIRUS In Bulgaria, 116; 1474; c.f. test, 762; infection of pregnant rats, 1126; in Netherlands, 2180; lab. diagnosis, 3245.
ABSCESSES In pigs, 2312.
ACETIC ACID Effect of infusion on appetite of cows, 854; acetate tolerance in sheep, 878-9; acetate utilization in sheep, 2677; 4086; metabolism in guinea-pigs, 2678.
ACETONAEMIA see Ketosis.
ACETYLCHOLINESTERASE see Enzymes.
ACETYLMETHIONINE For ketosis, 1220.
ACETYSALICYLIC ACID Mode of action, 1951.
ACHONDROPLASIA see Bones, diseases.
ACHROMOBACTERIUM Differentiation from non-pigmented Pseudomonas, 3149.
ACTH see Corticotrophin.
ACTINOBAICILLUS INFECTION In ovine epididymitis, 1408; in cattle, 3546-7; lignieresii in rumen, 3910.
ACTINOMYCES INFECTION In peritoneum of ox, 81; culture technique for A. israeli, 362; Actinodjodine therapy for cattle, 1071; properties of A. israeli, 1407, 2126; mastitis in sows, 1763; results of treating cattle, 3545; in slaughtered cattle in Roumania, 3909.
ADENOMATOSIS see Respiratory system, diseases.
ADENOVIRUS see Viruses, general.
ADJUVANTS Toxicity, 73; lesions caused by Freund's adjuvant, 797; effect on antibody production, 1834; in influenza vaccine, 2169; harmful effects on pigs, 2543-4.
ADRENAL GLAND
 General Ascorbic acid in fowls, 1083; histology in pigs, 1285; changes in bovine mucosal disease, 1466; function in whales, 1620; histology in sheep with scrapie, 1802; cholesterol and vitamin C in sheep, 1845; histopathology in cows, 2289; action of drugs on fowls, 2328; enzymes in pigs, 2335; vascularization in cats, 2361; progestins in cows, 2372; changes in blood of adrenalectomized calves, 3416; function of the medulla in foetal sheep, 3417; Thorn's test on pigs, 3484; histochemistry in sheep, fowl, duck, 4184.
 Cortex In sick pigs, 618; in sick dogs, 895; corticosterone excretion in fowls, 936; nuclear changes after death in pigs, 1483; function in sheep, 2360; structure in dehydrated rats, 4153.
AEROSOLS Of antibiotics for pigs, 538; of distemper virus, 1130; of foot and mouth virus, 1788; of dried vaccines, 1399; 1835.
AFRICAN HORSE SICKNESS see Horse Sickness.
AFRICAN SWINE FEVER see Swine Fever, African.
AGALACTIA In sows, 3366.
AGALACTIA, CONTAGIOUS OF SHEEP & GOATS Similar disease in sheep in Moscow area, 3202; 3914.
AGE Changes in calcium metabolism in rats, 254; nutrition and longevity, 851; longevity of dogs, 925; presentility in farm animals, 1911; gastric necrosis in mice, 2660.
AIR-BORNE INFECTION Foot and mouth disease, 394; detection of viruses, 2524; ringworm fungus in air, 3198; fungal spores in cowshed, 3902.
AIR SACS Anatomy in fowl, duck, pigeon, 939; shadow effect on electrocardiogram of fowls, 1271; coli bacilli in fowls, 1707; 2203; infections in turkeys, 2480.
ALBANIA see Psittacosis-lymphogranuloma group.
ALDRIN see Parastictides.
ALPACAS see Brucella Infection, general; Mycobacterium tuberculosis Infection, general; Rabies; Streptococcus infection.
ALTITUDE Sickness in animals in Peru, 213; sickness in cattle, 1914; brisket disease in calves, 2343.
ALUMINIUM HYDROXIDE Compared with the oxide for virus vaccines, 3952.
AMICARBALIDE For piroplasmosis, 3936.
AMIDOSTOMUM In ducks, geese and wild birds, 1862.
AMINO ACIDS Arginine deficiency in chicks, 865; 1205; lysine and methionine supplements for rabbits, 3339; absorption in sheep, 3684.
AMINOACRIQUINE For trichomonas in poultry, 376; against theileria in cattle, 708; in bovine trichomoniasis, 2137-8.
AMMONIUM Action of ammonium chloride on piglets, 4069.
AMPHOMYCIN For avian spirochaetosis, 1746.
AMPHOTERICIN For ringworm, 1764.
AMPROMIUM For coccidiosis, 2143.
AMYLOIDOSIS In serum horses, 2685.
ANAEMIA, GENERAL Infectious anaemia in cats, 372; caused by Fasciola in horses, 465; in mink, 896; caused by trichostrongyles in sheep, 1223; in piglets, 1897; 1898; 1900; 1901; 3345; 3696; caused by hookworms in dogs, 2523; in mineral-deficient chicks, 3017.
ANAEMIA, EQUINE INFECTIOUS Diagnostic value of Heinz bodies, 108; tissue culture of virus, 109; 1456; 3238; conglutination and gel diffusion tests, 750; cytochemistry of spleen lesions, 751; Jolly's bodies in erythrocytes, 931; cytochemistry of haemosiderin, 1113; in Venezuela, 1457; following castration, 2174; pathology of liver, 2175; isolation of virus by rabbit passage, 2527; Polish studies, 2920; spleen biopsy, 2921; effect of exercise on infected horses, 3237; in Australia, 3445.
ANAESTHESIA & ANALGESIA Bulbocapnine in cattle and cats, 243; convocain, 922; of fowls, 923; 3107; German book on local anaesthesia, 979; guaiaacol glyceryl ether as relaxant in horses, 1262; dihydrocodeine in dogs, 1263; chlorpromazine and pentobarbitone for guinea-pig, 1958; epidural in sheep, 1983; suxamethonium in horses, 2717; action of halothane on animals, 3073; immobilization of captive wild animals, 3395; immobilizing Uganda kob, 3396; Sernyl for goats, 4140; propionylpromazine in mice, 4141; mechanism of nerve block, 4142; molecular theory of general anaesthesia, 4143; pentobarbitone in lions, 4144.
ANAPHYLAXIS see Immunology.
ANAPLASMA INFECTION In cattle free from ticks, 90; properties of erythrocytes, 1779; in sheep and cattle in U.S.S.R., 2903; c.f. test, 3565; anaemia in infected calves, 3566.
ANATOMY Book on structure of the fowl, 599; respiratory system in fowl, duck, pigeon, 939; lumbar and sacral regions of sheep, 1983; German book on post-mortem technique, 2038; innervation of preputial muscles in bull and ram, 2352; cardiac vessels in sheep and goats, 2359; cat adrenal gland, 2361; retractor clitoridis muscle in animals, 2362; dog prostate gland, 2363; German textbook, 2406; bile ducts in dog, rat and rabbit, 3759; bronchial arteries in ox, 3782; comparative anatomy of birds, 3830; arteries in fowls, 938; 4183.
ANGYLOSTOMA Bephenium therapy for dogs, 471; 2988; in dogs in Australia, 2622; anaemia in dogs, 2623; insect hosts, 2624; cat and dog strains, 2987; treatment with disphenol, 3556; treatment with thienium, 4038.
ANDROGENS see Sex hormones.
ANTELOPES see Haemonchus; Trypanosoma infection.
ANTHELMINTICS
 General Technique for screening drugs against tapeworms, 468; pesticidal activity of dichlorophen, 468; Yomesan, new tapeworm drug, 1165-7; BW 58-232 (a dihydrotriazine), 1168; piperazine for oxyurias in mice, 2253; methods for screening dogs active against lungworms, 2641; carbon tetrachloride for ducks, 2985; piperazine and parasitic eosinophilia, 3299.
 Cattle Australian report, 1310; bephenium for zebu cattle, 2989; bithionol for Fasciola, 149; carbon tetrachloride, 2329; 2607; carbon tetrachloride plus hyaluronidase, 3641; coumaphos, 1178; 2990; mixture of coumaphos and trichlorphon, 2639; cyanacethydrizide, 1185; 2643; 3003; 3659; diethylcarbamazine, 1530; 2642; hexachloroethane, 1526; hexachlorophene, 805; toxicity of a mixture of hexachlorophene and carbon tetrachloride, 812; mepacrine for flukes, 2609; methyridine, 2244; 2630-3; 2634-6; 3655; mixture of phenothiazine, piperazine and hexachloroethane, 1538; phenothiazine for zebu cattle, 3652; phenothiazine, copper sulphate and nicotine sulphate, 4041; piperazine for thelazia, 1186; Ruelene, 2991; 3655; thiabendazole, 4031-6; trichlorphon, 2648; 3655.
 Dog and cat Bithionol for tapeworms, 151; bephenium, 471; 2988; compound 611 C 55 for hookworms, 1181; disphenol for hookworms, 3556; dithiazanine, 3319; 3667; thienium for hookworms, 4038.
 Fowl Bithionol for tapeworms, 151; hygromycin, 836; 1873; 3317; piperazine, 1872; 3665; tin arseniate, 2243; a method of testing, 1874.
 Horse Piperazine, 1869; methyridine, 2245; phenothiazine, 4028; phenothiazine plus piperazine and carbon disulphide, 4030.
 Sheep and goat Bephenium, 156; 2629; b's (trichloromethyl) benzene for flukes, 809; 810; 2234-5; bithionol for tapeworms, 150-1; carbon tetrachloride, 2608; 3741;

ANTHELMINTICS—Sheep and Goat—[cont'd.]

copper sulphate plus sodium arseniate for goats, 3310; coumaphos, 1178; 2332; 2638; coumaphos and Coroxon, 4045; cyanacetylhydrazide, 158; Cyanamid 88023, 4044; dichlorophen for Moniezia, 150; 2242; diethylcarbamazine and Entobex, 1530; hexachloroethane, 808; 1160; hexachloroethane plus carbon tetrachloride for fluke, 811-2; 1159; hexachlorophene, 33297; lead arsenate against Moniezia, 467; methyridine, 2244; 2630-3; 2634-6; phenothiazine, 1856; 2248; 2332; 2629; 3653; 4029; synergized phenothiazine, 2993; ronnel, 2995; Ruelene, 1174; 1179; 1857; 2248; 2995; 4046; thiabendazole, 4034-6; tin arsenate for tapeworms, 820; trichlorophen, 2637; 2995; mixture of trichlorophen and coumaphos, 2638; new approach to treatment, 2992; action of drugs on infusoria in rumen, 3215; causal factors in muscular dystrophy, 3717.

Swine Dithiazanine in feed, 831; carbon disulphide, 1176; malathion for Strongyloides, 1535; bithionol and hexachlorophene for flukes, 2233; hygromycin, cadmium oxide, sodium fluoride and piperazine, 2646; arsanilic acid, cyanacetylhydrazide, isoniazid and diethylcarbamazine, 3313.

ANTHRAX see *Bacillus anthracis*.

ANTIBIOTICS Sensitivity of bacteria from dogs, 80; sensitivity of staphylococci, 303; sensitivity of avian PPLO, 370; resistance of staphylococci from vet. surgeons, 5; antibiotic aerosols for pigs, 538; potentiation of antibiotics, 539; action of combinations of antibiotics, 540; 1672; 2121; aspergillus extract for tuberculosis, 617; action on protozoa, 697; no effect on lipid metabolism of chicks, 861; antibodies against kanamycin, 918; sensitivity of salmonella, 1360; antibiotic sensitivity tests, 1593; agglutination of antibiotic-treated erythrocytes, 1594; therapy complicated by fungus infection in horses, 1760; effects of administration on bacteriological diagnosis, 2120; viral antibiotics, 2215; resistance of bacteria from animals, 3192; residues in milk, blood and urine, 3392; mycotic mastitis complicating antibiotic therapy, 3539; transfer from blood to milk in udder, 4136.

ANTIGENS see Immunology, antigens.

ANTIMONY see Anthelmintics.

ANTI-OXIDANTS DPPD residues in chicks and eggs, 561; butylated hydroxyanisole toxicity, 3335.

ANTRYCIDE see Quinapyrimoxine.

ARAMITE see Parasiticides, toxicity.

ARGENTINA see *Brucella* infection, cattle; Encephalomyelitis, equine; Mal sego; Manchester wasting disease; Mink; Psorergates.

ARGININE see Amino acids.

ARSANILIC ACID see Anthelmintics.

ARSENIC In bovine hair, 544; death of sheep after dipping, 1588; metabolism in cattle, 2337; sodium arsenite for swine dysentery, 2805; an arsonic acid compound for blackhead, 2894.

ARTERITIS, EQUINE VIRUS see Influenza, equine.

ARTHRITIS see Joints.

ARTHROBOTRYS see Fungi, general.

ARTHROPOD-BORNE VIRUSES see Viruses, General.

ARTHRITIS DEFORMANS see Joints.

ASCARIDIA Piperazine treatment of fowls, 1872; 3665; immunization of chicks, 1878; X-ray diagnosis, 4053.

ASCARIS Immunological properties of worm extracts, 159; electrophoresis of antigens, 160; destruction of eggs in soil, 162; infection in goats, 475; migration in pigs, 476; 1870; effect of invasion on intestines, liver and lungs of mice, 477; dithiazanine treatment, 831; infestation and growth of piglets, 832; experimental infection of lambs, 833; obstruction of pancreatic duct in pig, 893; piperazine treatment of horses, 1869; immunization of guinea-pigs, 1871; immunization of pigs, 1878; leucocytosis in rabbits and pigs, 2250; blood enzymes of infected pigs, 2942; flotation method for eggs, 3660; vitellum in calves, 3661; porcine strain pathogenic for man, 3662; haematology of infested dogs, 3663; toxic fractions, 4051.

ASPERGILLUS INFECTION Generalized infection in cows, 360; aspergillus antibiotic, 617; diarrhoea in colts, 672; pneumonia in calves, 1080; flavofungin therapy for chicks, 1405; in horse as result of antibiotic therapy, 1760; generalized in lamb, 1781; *A. clavatus* poisoning in cattle, 1762; abortion in cows, 2113; papular dermatitis in pigs, 2125; control by hygiene, 2471; in geese, 2886; in eggs, 3903.

ASTHMA see Respiratory system, diseases.

ASUNTOL see Coumaphos.

ATLANTICS see Tranquilizers.

ATAXIA see Nervous system, diseases; Swayback.

ATHEROSCLEROSIS see Circulatory system, arteries.

AUJESZKY'S DISEASE Diagnosis by tissue culture, 124; tissue culture of virus, 405; 2509; 3578; in cattle, 1101; pathogenesis, 1789; role in porcine pneumonia, 1790; combined vaccines for pigs, 1837; in pigs in Germany, 2159; DNA synthesis by virus, 2160; in sheep, 2510-1; live vaccine for pigs, 2512; abortion and foetal lesions in pigs, 3223; immune gamma globulin, 3579; in Ireland, 3822; modes of infection of cattle, 3944-5.

AUREOMYCIN see Chlortetracycline.

AUSTRALIA Role of veterinarians, 881; the sheep biology laboratory in New South Wales, 1625; Yearbook of Institute of Vet. Inspectors of N.S.W., 1658; beef production bibliography, 2776.

See also *Ancylostoma*; *Brucella* infection, cattle; *Diarrhoea*, bovine virus; *Echinococcus*; *Encephalomyelitis*, bovine; *Facial eczema*; *Infertility*, cattle; *Myxomatosis*; *Pleuropneumonia*, bovine; *Pleuropneumonia-like organisms*; *Rabbits*; *Reports*; *Rickettsia* infection, *Q* fever; *Stomatitis*, bovine; *Ticks*, *Ixodes*; *Trichomonas*; *Vibrio* fetus infection; *Transport of animals*; *Zebu* cattle.

AUSTRIA see Encephalomyelitis, Avian.

AVIAN LEUCOSIS see Fowl paralysis.

B VIRUS see Virus B.

BABESIA INFECTION (PIROPLASMOSIS)

General Advantages of thick blood smears, 2492; control in U.S.S.R., 2903; Diampron therapy in dogs, 3208; traubmanni in African bush pig, 3937.

Cattle Berenil therapy, 384-6; immunity of calves to *B. argentina*, 707; distribution in Britain, 1574; *B. divergens* and *B. major* in Netherlands, 1085; bigemina in *Boophilus*, 1310; in Indonesia, 1778; *M & B 6062A* therapy, 2148; separation of bigemina from argentina and *Theileria mutans*, 2491; cerebral in Venezuela, 3207; argentina in Queensland, 3445; amicarbalide therapy for bigemina infection, 3936.

BABOONS see Wild Animals.

BACILLUS ANTHRACIS Action of disinfectant on spores, 16; differentiation from *B. cereus*, 306; radio-active bacilli, 989; haemolysin, 990; 3469; diagnosis by fluorescent phage, 2808; identified by gamma phage, 3132; persistence of spores in body, 3134.

BACILLUS ANTHRACIS INFECTION (ANTHRAX) Intra-dermal immunization, 14; in mill workers from goat hair, 15; combined vaccine for sheep, 357; antigen adsorbed on polystyrene, 459; abortion in a cow, 609; immunity from noncapsulated strains, 610; immune serum not enhanced by hyaluronidase, 611; aerosol dust vaccine, 1399; 1835; toxic effects of anthrax bacteraemia, 2044; in pigs, 2290; in mink, 2417; c.f. titres in g.pigs, 2418; spleen lesions, 2419; infection of immunized guinea-pigs, 2806; germ-free rats not resistant, 2807; drugs diminish immunity, 3133; freeze-dried saponin vaccine, 3467; immune gamma globulin, 3468.

BACILLUS CEREUS Differentiation from anthrax bacilli, 306; in bovine mastitis, 2045; fate of labelled bacilli in mouse, 2046.

BACILLUS THURINGIENSIS Control of fly larvae in faeces, 799; 1519.

BACITRACIN Toxicity for guinea-pigs, 3072.

BACTERIA, GENERAL Unidentified organism from buffalo, 34; method for preparing endotoxins, 49; bacteria in rumen, 2482.

BACTERIOPHAGE see *Bacillus anthracis*; *Brucella* group; *Escherichia coli*; *Haemophilus* infection; *Listeria monocytogenes*; *Staphylococci*.

BACTERIUM ANITRATUM From fowls and a calf, 3533.

BACTERIUM COLI see *Escherichia coli*.

BACTERIUM FRIEDLANDERI In dog, 636.

BACTERIUM VISCOSUM EQUI Septicaemia in rabbits, 1359; in horses and pigs, 1702.

BACTEROIDES MELANINOGENICUS Infections in animals, 355.

BAHAMAS see Reports.

BALANTIDIUM In pigs and cattle, 1781-2; infection in capybaras, 3941.

BARIIUM see Poisoning, inorganic.

BASUTOLAND see Reports.

BATS see Rabies.

BAYER COMPOUNDS see Parasiticides, general.

BAYER L13/59 see Trichlorophen.

BAYER 21/199 see Coumaphos.

BEAVERS Meat unsuitable for dogs, 3327.

BECHUANALAND see Reports.

BEE see Nutrition, cattle.

BEHAVIOUR OF ANIMALS The female of the species (book), 601; tonic immobility or hypnotic state in farm animals, 1305; Josiah Macy conference, 2033; grazing behaviour of cattle, 2777; zebu cattle at pasture, 3109.

BELGIUM see Blue comb disease; Insemination, artificial; Mink; Reports; Rhinitis, porcine; *Rickettsia* infection, *Q* fever.

BENZATHINE see Penicillin.

BENZENE HEXACHLORIDE see Parasiticides.

BEPHENIUM see Anthelmintics.

BERENIL Action on trypanosome extracts, 86; for piroplasmosis, 384-6; resistant trypanosomes, 1079; toxicity for camels, 2890.

BERMUDA see Reports.

BESNOITA INFECTION In cattle, 1425-7.

- BETA-PROPIOLACTONE** In mastitis vaccine, 1319; carcinogenicity, 1548; for making toxoids, 1750; Newcastle disease vaccine, 2202; 2565; rabies vaccine, 3948.
- BILE DUCTS** see Liver.
- BILHARZIELLA** In ducks, 2238.
- BITHIONAL** see Anthelmintics.
- BISON** see Wild animals.
- BLACK DISEASE** see Clostridium oedematis infection.
- BLASTOMYCES INFECTION** In dogs, 2468; 3194; in soil, 2469.
- BLOAT** see Tympanites.
- BLOOD**
- General** Isoagglutinins in piglets, 1478; ultracentrifugation of bovine serum, 1887; haematology of grazing horses, 2339; preparation of blood smears, 2492; pH determination, 2782; changes in thyroidectomized sheep, 3404; changes in adrenalectomized calves, 3416; effects of ascariasis in dogs, 3663; haematology of growing piglets, 3696; blood formation inhibited by oestrogens, 3763; the blood of lambs and young goats, 3764.
 - Chemical composition** In lambs, 1972; composition in tuberculous cattle, 2422; total protein in animals, 3766; proteins in cattle, 1623; 1971; 3765; proteins in calves denied colostrum, 175; proteins in sheep, 823; 3765; proteins in pig, 1237; proteins in dogs, 99; 1241; 3727; proteins in cats, 1561; proteins in hen, 2734; alkali reserve in pigs, 3091; antibiotic residues in blood, 3392; ascorbic acid in cows, 3710; bicarbonate in cattle and pigs, 929; citric acid in fowls, 3090; lipids in horses, 273; lipids in cattle, 3333; sugar in calves, 3767; determination of Ca and Mg, 3093; Ca and Mg in bullocks, 1565.
 - See also Cholesterol; Copper; Enzymes; Iodine; Iron; Phosphorus; Potassium; Sodium; Urea.
 - Coagulation** In cows fed sugar-beet leaves, 1890; in sick dogs, 2291; prothrombin complex in ox, sheep, dog, cat, rabbit, 2725; in deer, 2951; in fowls, 3405; in leptospirosis, 3527.
 - Corpuscles (red)** R.b.c. count of inbred fowls, 256; Jolly's bodies in horses, 931; agglutination of antibiotic-treated erythrocytes, 1594; in bovine anaplasmosis, 1779; labelled erythrocytes in monkeys, 1908; Na and K in sheep, 2727; cell volume in lambs, 2728; survival in calves, 3566; Heinz-Ehrlich bodies in cattle, 4117.
 - Corpuscles (white)** Changed by Helleborus extract, 234; cell picture in fowls with Newcastle or pullorum disease, 444; carriage of viruses by leucocytes, 453; eosinophiles from horse blood, 1269; staphylococci in leucocytes, 1321; method of isolating leucocytes, 1657; in swine fever, 1803-5; drumstick appendages in animals, 1970; in feline enteritis, 2195; PAS reaction, 2340; leucocytogen in bovine plasma, 2657; leucocyte counts in goat, 3294; eosinophiles under fluorescence microscope, 3816; brucella in monocytes, 3884; leucocyte count after vaccination, 4003.
 - Diseases** Haemophilia B (Christmas disease) in dogs, 1303; haemolytic disease in foals and piglets, 1151-2; attempt to produce haemolytic disease in sheep, 2226; haemophilia in a horse, 3103; hyperlipaemia in cattle, 3333.
 - Globulins** Beta-globulin types in pigs, 274; gamma globulin therapy for staphylococci, 986; gamma globulin for leptospirosis, 1044; abnormal globulins during infection, 2879; beta-globulin types in cows, 3436; gamma globulin for anthrax, 3468; gamma globulin for Aujeszky's disease, 3579.
 - Groups** Proceedings of conference, 255; in cattle, 510; 1517; in pigs, 1152; in horses, 1516; in fowls, 2224-5; and milk composition in cows, 3080; preparation of bovine antigens, 3636; Rh antigen in sheep, 3637; in bovine foetuses, 3761; 4159.
 - Haemoglobin** Synthesis in piglets, 1897; effect of clamping umbilical cord, 1293; types in sheep, 2729-30; in lambs and goats, 3764; methaemoglobin in sheep, 4114.
 - Picture** In mink, 896; in dogs, 387; 1501; 3674; zebu cattle, 1268; in tuberculous fowls, 1336; in pigs, 1479; 1901; in racehorses, 1969; in parasitized sheep, 2254; erythroblastosis in dogs, 3042.
 - Platelets** Thrombocytes in dourine, 2484; adsorption of myxoviruses, 3617; pig platelets labelled with radio-sulphur, 3762.
 - Pressure** In horses, 550; in giraffe, 932; in pregnant ewes, 1270; baroreceptor mechanisms in pigs, 1976; in fowls, 4160.
 - Transfusion** Effect on brucella agglutinins in cattle, 58; in vet. practice, 4135.
 - Volume** Of horse, 549.
- BLOWFLIES & FLESHFLIES** Australian report, 1310; trials of diazinon and dieldrin, 1518; Lucilia cuprina larvae on a bullock, 3281; control by Bayer compounds, 3445; Wohlfartia in sheep, 3638; L. sericata not controlled by releasing sterile males, 4005; Chrysomya on horses and cattle in New Guinea, 4006.
- BLUE COMB DISEASE** In Belgium, 3371.
- BLUETONGUE** Strains of virus, 1473; in Sudan, 2932; in sheep in U.S.A., 2933.
- BONE MARROW** Effect of marrow injections on calves, 1933.
- BONES**
- General** Persistence of antibiotics, 920; metabolism in rats, 1280; the bone matrix of fowls, 1977; bone mineralization, 2366; epiphyses in foals, 2743; bone composition in calves, 3014; bone formation in bovine third phalanx, 3058; normal ossification of vertebrae in dog, 3086; strontium-90 in sheep, 3372; 4104; fluorescence of tetracyclines in bone, 3394; development in under-fed pigs, 4064; effect of delay on ash estimations, 4207; French book on comparative osteology, 4217.
 - Diseases** Experimental osteomalacia in goats, 182-3; eosinophilic panostitis in Alsations, 222; plasma-cell tumours in dog, 486; rickets in dog, 503; spondylosis deformans in dog, 579; rickets in calves from calcined magnesite, 1209; nutritional disease of lion, 1215; cage layer osteoporosis in hen, 1231; epiphyseal separation in pig, 1246; tuberculosis in fowl, 1680; achondroplasia in dog, 1928; hypertrophic osteoperiostitis, 2252; osteodystrophy in cow, 2274; changes in underfed fowl, 2284; imperfect osteogenesis in dog, 2313; viral osteopetrosis in fowl, 2574-5; 3621; osteomalacia in horse, 2675; hypertrophic osteoarthropathy in a mare, 2686; osteosarcoma in dog, 3006; rickets in lamb, 3023; rickets in chick, 3024; pulmonary osteoarthropathy in mink, 3043; alimentary osteodystrophy in sheep, 3354; human osteoporosis treated with calcium gluconate, 3702; osteodystrophia fibrosa in goats, 3735; osteoporosis in animals, 4080; pathology of osteoporosis, 4081.
 - Fractures** Splint for cows, 226; fixation by epoxy resins, 2718.
- BOOKS**
- Anaesthesia** Narcosis of animals: local anaesthesia (German), 979.
 - Anatomy** Bradley's structure of the fowl, 599; veterinary anatomy (German), 2406; comparative osteology (French), 4217.
 - Bacteriology** Biology of micro-organisms, 1315; Mackie & McCartney's handbook, 2027; brucellosis of farm animals (Russian), 2028; pathology of tuberculosis in animals (German), 2786; haemorrhagic septicaemia of cattle and buffaloes, 3449; the bacteria: volume II, 3826; studies on tubercle bacilli (German), 3827.
 - Biochemistry** Vitamin B 12, 593; metabolism of sulphur compounds, 1317; radio-active isotopes in biochemistry, 3455.
 - Dictionaries** Dictionary of scientific terms, 2039; Russian-English agricultural, 2409.
 - Diseases, general** Veterinary medicine by Blood & Henderson, 295; farm animals in health and disease, 595; diseases of wild animals (Italian), 597; orthopaedic surgery of dog and cat, 598; advances in veterinary science, 2403; diagnostic aids in vet. medicine, 2405; diagnosis of poultry diseases, 2702; diseases of the pig, 3117; poultry service manual, 3118; African veterinary handbook, 3453; diseases of monkeys (Russian), 3723; sheep husbandry and diseases, 3832; poultry diseases, 3829; FAO/OIE Animal Health Year Book, 4089.
 - Food hygiene** German meat inspection law, 1666; 4218.
 - Laboratory animals** Diseases of lab. primates, 296; rats and mice as lab. animals (German), 596; provision of laboratory animals for research, 4219; breeding and management of lab. mice (French), 4220.
 - Medicine** Lectures for British Postgraduate Medical Federation, 1669; the scientific basis of medicine, annual reviews, 3454.
 - Miscellaneous** The female of the species, 601; International zoo yearbook, 1668; General index to Arch. wiss. prakt. Tierheilk., 1670; the Veterinary Annual, 2031; history of vet. medicine in America, 2408; rudimentation (German), 2790; biological problems arising from the control of pests and diseases, 2794; history of the horse (German), 2795; livestock health encyclopaedia, 3457.
 - Mycology** Russian book on mycotoxicoses, 363; 3552; Dictionary of the fungi, 2029; fungi of India, 4215.
 - Nutrition** Diet and reproduction in pigs, 1316; chemicals in food and farm produce, 2793; animal nutrition (French), 3828.
 - Parasitology** Helminths of animals and man (in German), 592; helminths of birds (Russian), 2030; parasites in avian pathology (French), 2402; trichostrongylids of animals and man, 2788; diagnosis of parasitic diseases (Hungarian), 3116; Russian textbook translated into English, 4216.
 - Pathology** Atlas of diagnosis of swine fever (German), 1663; pathology of tumours, 2787; principles of veterinary pathology, 3452.
 - Pharmacology** Supplement to International Pharmacopoeia, 980; supplement to U.S. Dispensatory, 1665; new

- BOOKS—Pharmacology**—[cont'd.]
and nonofficial drugs, 2789; therapeutic drugs (Russian), 2404.
- Physiology** Comparative physiology, volume 5 (German), 2032; central nervous system and behaviour, 2033; the avian embryo, 2034; mammary gland and its secretion, 2791; digestive physiology and nutrition of the ruminant, 3119; reactions in the rumen, 3451; biology and comparative physiology of birds, 3830; animal vision, 3831.
- Radiations** Low-level irradiation, 1664; hazards to man, 3375.
- Radiography** Technique for the veterinary surgeon, 2035.
- Reproduction** A.I. in animals, 297; reproduction in the dog, 298; Marshall's physiology of reproduction, 3120; control of ovulation, 3121.
- Surgery** Orthopaedic surgery of dog and cat, 598; veterinary surgery (German), 2037.
- Technique** Applied microscopy and photomicrography, 600; techniques in research on farm animals, 2407; technique of photomicrography, 1318; post-mortem technique (German), 2038.
- Virology** Rabies monograph (German), 2400; advances in virus research, 2401; principles of animal virology, 3115; laboratory guide to virology, 3450.
- Zootecny** Czech book on poultry, 602; animal husbandry heresies, 1667; principles and methods of animal breeding, 2036; chemical and natural control of pests, 2792; animal husbandry, 3456; animal husbandry in Asia and America (Italian), 4221.
- BOOPHILUS** see Ticks.
- BORDETELLA BRONCHISEPTICA** see *Haemophilus* infection.
- BORNA DISEASE** Changes in c.s.f., 227; Virolitine inactive against virus, 743; role of virus in bovine malignant catarrh, 1118; dried vaccine for horses, 2919.
- BORRELIA ANSERINA** Immunization of fowls, 348; antibiotic therapy, 1746.
- BOTULISM** see *Clostridium botulinum*.
- BRAZIL** see Food & Agriculture Organization; *Leptospira* infection, cattle; Nutrition, cattle; Poisoning, plants.
- BRISKET DISEASE** see Altitude.
- BRITISH GUIANA** see *Encephalomyelitis*, equine; Reports.
- BROMSULPHALEIN** see Liver function tests.
- BRONCHITIS, AVIAN INFECTIOUS** Epidemiology, 446; quail virus and fowl virus, 789; variant virus, 1139; comparison of strains by gel diffusion test, 1503; histology, 1768; immunization, 3618-9.
- BRONCHOPNEUMONIA** see Respiratory System.
- BRONCHOSTRONGYLUS** In cat, 1868.
- BRUCELLA GROUP** Guinea-pig test for virulence, 64; tetrazolium and dehydrogenase activity, 67; cation-exchange resin for improved isolation, 340; classification, 347; virulence and resistance to antibiotics, 647; attenuation of *Br. abortus* in snakes, 1031; chemical fractionation, 1032; gel diffusion studies on antigenic structure, 1040; bacteriophage, 1041; 1373; 1730; 2036; 2857; survival in pickled meat, 1370; catalase test, 1374; 3523; urease test, 3523; culture medium, 2095; 2854; 3173; 3522; Thionin blue test, 2862; relationship between phage susceptibility and colony type, 3171; Ceylon strain of *Br. abortus*, 3505; DNA fraction of *abortus*, 3514; glutamate metabolism and virulence, 3519; metabolism of suis, 3521; susceptibility to streptomycin, 3885.
- BRUCELLA INFECTION**
General Infection of guinea pigs, 63; infection of placenta, 1034-5; lesions in spleen and liver of mice, 1728; Russian book, 2028; abortifacient lipopolysaccharide from *Br. abortus*, 2852; in milk in Yorkshire, 3136; veterinarians as disseminators, 3167; in Canada, 3444; protective role of bacteriophage, 3516; in South Africa, 3883; infection in monocytes, 3884; in alpacas, 3168; in deer, 3524; in dogs, 2858; in hares, 68; 1039; 1733; 2861; in lice, 343; in reindeer, 2093; 3517; in wild bison, 3141.
- Cattle** Effect of bleeding and blood transfusion on agglutinin titre, 58; Indian studies, 59; melitensis infection, 346; 2092; a review, 356; numbers of brucella in meat, 645; incidence in slaughtered cattle, 1036-7; mastitis, 1718; lesions in supramammary lymph nodes, 1721; opsonin test, 2086; incidence of agglutinins in bulls, 2445; histopathology of foetus and placenta, 2446; persistence of infection, 2847; brucella in milk, 2848-9; in Argentina, 2085; in Australia, 1398; in Canada, 1028; in Germany, 2087; 2092; 2846; 3878; in Greece, 1719; in Netherlands, 644; 3447-8; in Northern Ireland, 644; 1365; in Scotland, 1720; in Sudan, 1364; in the Ukraine, 1366; in U.K., 657; 1720; 2848; in U.S.A., 2444.
See also *Brucella* infection, diagnosis, immunology and treatment.
- Diagnosis** Vaginal tampon test, 56; agglutination test on haemolysed blood, 57; c.f. test on various animals, 342; 3510; c.f. test on cattle, 1368; 1725; c.f. test applied to water, soil etc., 1734; antigen for c.f. test, 2448; c.f. test on pig serum, 2860; antigens for agglutination test, 341; 1030; 2094; Coombs' antiglobulin test on bovine sera, 1367; Coombs' test on pigs, 2451; agglutination test on goats, 1378; milk ring test, 1720; heat-inactivation agglutination test, 1722-3; 3880; absorption of serum with mixed bacterial antigen, 1723; agglutination test for sheep, 1732; capillary-tube ring test, 2449; whey agglutination test, 2850; acidified antigen to distinguish vaccinal titres, 2851; laboratory diagnosis, 3174; testing samples collected for butter-fat test, 3506; interpretation of serological tests, 3507; standardized antigen, 3508; i/d test on dogs, 2858; comparison of brucellins, 3509; microcolony test for antibodies, 3511; standard agglutination test, 3879; fluorescent antibody test, 3881.
- Horses** Infertility in a stallion, 642; four cases, 2844; fistulous withers, 2845.
- Immunology (general)** Phagocytosis, 62; antibodies inhibited by hyperimmunizing rabbits, 140; discussion on prophylaxis, 643; cytotoxic action of brucellin, 648; immunization by DNA proteins, 1033; placenta protection test for vaccines, 1035; sizes of blocking and agglutinating antibodies, 1038; absorption of antibody by gut, 1147; cell-wall vaccine, 1372; labelled gamma globulin fed to rats, 1729; blocking phenomenon, 2089; 2447; fluorescent globulin from hyperimmune serum, 2856; comparison of vaccines for cattle, 2088; Strain B 112 for sheep, 2450; vaccines for sheep and goats, 3170; killed adsorbed vaccine, 3512; immunity from culture filtrate, 3513; testing vaccines on cortisone-treated mice, 3515.
- Immunology (Strain 19)** Comparison of S. 19 and adsorbed vaccine, 60; rough form of S. 19 not immunogenic, 61; oral immunization of g.pigs, 344; opsonin titres in immunized cattle, 345; 2088; intra-uterine inoculation, 1034; aerosol dust vaccine, 1399; 1835; development of agglutinins in vaccinated calves, 1724; distribution of Strain 19 in body of lambs, 2853; for reindeer, 3517; comparison of S. 19, Russian BA and Polish PD strains, 3882.
- Man** In dairy and meat workers, 66; role of meat, 1037; in the Ukraine, 1366; from milk, 1369; in veterinary students, 1377; Russian vaccine, 2863; in a veterinary surgeon, 3518.
- Sheep and goats** Simultaneous immunization against brucella, anthrax and pox, 357; reliability of diagnostic tests, 646; c.f. test, 342; strain 19 in rams, 1310; granulomatous lesions, 1376; melitensis antigen for agglutination test, 1731; epididymitis, 1735-7; 2855; 3169; strain B 112 vaccine, 2450; comparison of vaccines, 3170; histology of melitensis infection, 3172; in goats from Libya and Egypt, 3520; in Australia, 588; in Czechoslovakia, 3169; in Greece, 1719; in Poland, 1375.
- Swine** In Denmark, 65; in Bulgaria, 2090; serological diagnosis, 2451; in Czechoslovakia, 2859; c.f. test, 2860.
- Treatment** -Pecudin in cattle, 1029; 1726-7; 1371; chloramphenicol treatment of a stallion, 642.
- BRUCELLA MELITENSIS** see *Brucella* infection, cattle, sheep.
- BRUCELLA SUIS** In hares, 68; 1039; 1733; 2861; properties of 62 strains, 69; comparison of Thomsen's type and Traub's type, 2091; metabolism, 3521.
- BRUCELLA TULARENSIS INFECTION** In two dogs, 1379; immune serum from fowls, 1738.
- BRUCEI** Endemic filariasis in Malaya, 3318.
- BUDGERIGARS** Manganese and French moults, 3348; psittacosis, 3620.
- BUFFALOES** Bacterial lymphangitis, 34; reproduction, 555; immunity to pasteurized, 631; helminths, 4025.
See also Catarrh, bovine malignant; Climate; Infertility, cattle; Kidneys, diseases; Lice; Magnesium; Mycobacterium johnii infection; Onchocerca; Pasteurella infection; Rabies, immunology; Salivary glands; Semen and spermatozoa; Temperature, body; Temperature, environmental; Trichosporon.
- BULBOCAPNINE** see Anaesthesia.
- BULGARIA** Diseases of animals, 2397.
See also Abortion, ovine; *Brucella* infection, swine; Chronic respiratory disease; *Leptospira* infection; Pneumonia, porcine.
- BURSA OF FABRICIUS** Effect of heat stress, 251; role in precipitin production, 457; effect of hormone treatment, 2967.
- CADMIUM** see Anthelmintics.
- CAECUM** see Digestive system, intestine.
- CAESIUM** In cattle grazing radio-active pastures, 2750; metabolism in fowls, 3374.
- CALCIFEROL** see Vitamin D.
- CALCIUM** Transfer in milk to offspring in rats, 180; imbalance in goats, 182-3; radiocalcium metabolism in cows, 210; 2301-2; in human c.s.f., 219; age and Ca meta-

CALCIUM—[cont'd.]

bolism in rats, 254; photometric analysis, 582; in heart muscle of pigs, 891; Ca/P ratio and bovine fertility, 1213; Ca/P imbalance in dogs, 1213; deficiency in rats fed meat, 1214; role of parathyroid in rats, 1280; metabolism in hens, 1287; 3019; 3341; 3374; 4155; sugar-beet leaves and Ca metabolism in cows, 1890; supplement for cats, 2271-2; metabolism in calves, 2733; 3694; 4079; dietary Ca and oxalate calculi, 3022; transport through gut wall, 3094; 4165; in muscle of cows and sheep with grass tetany, 3340; absorption in sheep, 3695; metabolism in sheep, 4166-7; gluconate therapy for osteoporosis, 3702; sodium fluoride and calcium metabolism, 3738; requirements of broilers, 4082; intravenous infusion and ECG in cattle, 4107; metabolism during chronic respiratory acidosis, 4155; metabolism in identical twin cows, 4157.

CALCIUM CHLORIDE Therapy for porcine oedema disease, 1924.

CALCULI see Urinary system.

CALIFORNIA TEST see Mastitis, bovine.

CALVES see Cattle, youngstock.

CAMBODIA see Pfeifferella whitmori.

CAMELS Diseases in Saudi Arabia, 3031; water metabolism, 3079; helminths, 4025.

See also Digestive system, ruminant digestion; Eimeria infection; Genital system, placenta; Leptospirosis infection; Neoplasms, general; Salivary glands; Schistosoma; Temperature, body; Trypanosoma infection; Vitamin E; Water metabolism.

CANADA Disease control, 1221.

See also Brucella infection; Encephalomyelitis, equine; Encephalomyelitis, porcine; Hepatitis, avian; Leptospirosis infection; Rhinitis, porcine; Rhinotracheitis, bovine; Wild Animals.

CANARIES see Pox diseases, canary pox.

CANDIDA INFECTION In rumen of cows, 1059; 2883; C. albicans in partridges, 1403; effect of intercurrent infection on tuberculosis, 20; fungi in ears of antibiotic-treated dogs, 1404; bovine mastitis, 2114; 2122; 3639; moniliasis in fowls in Spain, 2466; guillemontil in sheep, 2880; pathogenicity of albicans for mice, 2881; immunizing mice against albicans, 2882.

CAPILLARIA Hepatica in dog, 1536; in fowl, 1849.

CARBOHYDRATES see Metabolism.

CARBON DIOXIDE For slaughter of fowls, 3106; mineral metabolism after prolonged exposure to low concentration, 4156.

CARBON DISULPHIDE see Anthelmintics.

CARBON TETRACHLORIDE Action of repeated small doses of liver of mice, 1257; experimental poisoning in sheep, 1590; pathogenesis of liver injury, 1945; 3740; 3742; lesions in pigs, 1946; effect of i/m injection on blood of cattle, 2329; toxicity reduced by bovine vitreous humour, 2330; absorption of two injected preparations compared, 2331; pathology and prophylaxis of poisoning, 3739; blood levels in sheep, 3741.

See also Anthelmintics.

CARBUTAMIDE see Diabetes.

CASTRATION Of rams, 1304; equine infectious anaemia following castration, 2174.

CATARACT see Eyes.

CATARRH, BOVINE MALIGNANT Virus from wildebeest, 1117; role of Borna virus, 1118; in Peru, 1462; eye lesions, 1799; in buffaloes in Italy, 2532; isolation in cultured bovine thyroid cells, 2925; in deer, 2950.

CATS

Anatomy see Adrenal gland; Genital system, placenta; Pineal body.

Arthropod parasites see Mange; Ticks, Ixodes.

Bacterial and fungal diseases see Cryptococcus infection; Fusiformis ramosus; Leptospirosis infection; Mycobacterium tuberculosis infection; Nocardia; Pasteurella pseudotuberculosis; Ringworm; Salmonella infection; Staphylococci.

Diseases, general Book on orthopaedic surgery, 598; lip ulcer, 2314.

See also Anaemia; Circulatory system, diseases, lungs; Intervertebral discs; Neoplasms; Respiratory system, nose; Poisoning, organic poisons; Skin, diseases.

Helminth parasites see Helminth parasites, cats.

Nutrition see Nutrition, cats.

Physiology see Circulatory system, heart; Genital system, testicle, uterus; Sex hormones, progesterone.

Protozoal diseases see Eperythrozoon; Isospora infection; Toxoplasma.

Virus diseases see Enteritis, feline; Pneumonitis, feline; Rabies; Rhinotracheitis, feline.

CAT-SCRATCH DISEASE Review, 2580.

CATTLE

General Beef production in Australia, 2776; grazing behaviour, 2777; lacrimation as expression of fear, 3085. See also Farm buildings.

Anatomy see Anatomy; Muzzle; Skin.

Arthropod parasites see Blowflies; Lice; Mange; Mosquitoes; Musca; Oestridae, Dermatobia and Hypoderma; Ticks.

Bacterial and fungal diseases see Actinobacillus; Actinomyces; Aspergillus; Bacterium anitratum; Brucella infection; Clostridium botulinum and welchii; Coccioides; Corynebacteria; Dermatophilus; Escherichia coli; Haemophilus; Helminthosporium; Histoplasma capsulatum; Mastitis, bovine; Mycobacterium johnei; Mycobact. leprae; Mycobact. tuberculosis infection; Nocardia; Pasteurella; Pleuropneumonia; Pseudomonas; Ringworm; Shigella; Streptococcus; Staphylococcus; Vibrio fetus.

Diseases, general Survey of disease, wastage and husbandry in Britain, 1574; diseases in Australia, 881; diseases in Peru, 1914; health service for bulls in Germany, 2002; pseudomembranous coryza in France, 1226; milk allergy, 141; cerebrocortical necrosis, 1243-1244; ataxia during drought, 2661; spastic paresis, 3037; Manchester wasting disease, 3329; mineral deficiencies in Amazon valley, 4071.

See also Abortion, general; Blood, diseases; Circulatory system, heart; Diabetes; Digestive System, tongue; Eyes; Genital system; Foot; Genital System, diseases; Joints; Ketosis; Leucosis; Liver; Mammary gland; Melanosis; Metabolism; Milk fever; Nervous system, diseases; Paralysis and paresis; Poisoning, inorganic; Pregnancy; Respiratory system, diseases; Respiratory system, nose; Skin, diseases; Teeth; Teratology; Tympanites.

Helminth parasites see Helminth parasites, cattle.

Nutrition see Nutrition, cattle.

Physiology see Blood, groups; Circulatory system, heart; Climate; Digestive system, ruminant digestion; Fluorine; Genital system, ovary; Genital System, seminal vesicles, uterus; Glucose; Hair; Kidneys; Metabolism; Nervous system, brain; Parathyroid gland; Skin, general; Sugars; Temperature, environmental; Thymus gland; Transferrin; Water metabolism.

Protozoal diseases see Anaplasma; Babesia infection; Balantidium; Besnoitia infection; Eimeria infection; Giardia; Isospora infection; Theileria; Toxoplasma; Trichomonas foetus.

Viral and rickettsial diseases Virus pneumonia, 115; 419-21; Ume disease in Sweden, 422; enterovirus, 424; 1472; 3244; 3268; orchitis and endometritis, 1120; 1800; epidemic abortion, 1121-2; coital vesicular exanthema, 1470; virus from shipping fever, 2537; adenovirus from calf faeces, 2538; virus diseases in Finland, 3243; haemabsorbing virus from gut, 3595.

See also Aujeszky's disease; Catarrh, bovine malignant; Diarrhoea, bovine; Encephalitis, tick-borne; Encephalomyelitis, bovine; Exanthema, coital vesicular; Foot and mouth disease; Lumpy skin disease; Mucosal disease; Parainfluenza; Poliomyelitis; Pox diseases, general; Rabies; Rhinotracheitis; Rickettsial infection, Q fever; Rinderpest; Stomatitis, bovine virus; Wesselsbron virus.

Youngstock Comparison of calves with and without colostrum, 175; bacteria from calves with liver necrosis, 358; enteric diseases symposium, 1017; myopathy-dyspnoea syndrome, 1227; 2692; bulletin on calf rearing, 1557; unthriftness in calves in New Zealand, 1898; bacterial infections, 2111; excessive thirst, 2265; muscular hypertrophy, 2304; absorption from intestine, 2720; effects of eating wood shavings, 2737; proteinuria, 2738; oestrogen treatment of unthriftness, 3791.

See also Aspergillus infection; Circulatory system, general, heart; Digestive system, intestine; Iron; Lactoglobulins; Respiratory system, diseases; Tympanites; Vitamin A.

CEREBROSPINAL FLUID see Nervous system.

CEYLON see Brucella group.

CHENOPODIUM OIL Cesticidal activity, 468.

CHILOMASTIX In caecum of rats, 2150.

CHIMPANZEES As source of human infectious hepatitis, 3993; methods of handling, 4203.

CHINA see Encephalitis, Japanese; Leptospirosis infection.

CHINCHILLAS Haemophilus infection, 38; bibliography, 883; fur chewing, 3908.

See also Digestive system, intestines; Leptospirosis infection; Ringworm.

CHINOSOL F & M disease vaccine, 1100; ringworm treatment, 2884.

CHLORAMPHENICOL For brucellosis, 642; for contagious ecthyma, 1125; combination with other antibiotics, 2121; action on infusoria in rumen, 3215; resistance among salmonella, 3498; combined with colistin, 3537; tissue necrosis after injection into rabbits, 4137.

CHLORHEXIDINE see Disinfectants.

CHLORPROMAZINE see Tranquillizers.

CHLORTETRACYCLINE Action on young pigs, 84; for PPLO in fowls, 688; effect on vitamin E deficiency in rats,

CHLORTETRACYCLINE—[cont'd.]

856; given in food to milch cows, 857; mode of action in calves, 858; effect on chicks, 860; 1777; residues in fowls fed high levels, 862; persistence in bone, 920; fluorescence in bone, 3394; resistant *S. typhi-murium* from fowls, 1288; in milk of injected cows, 1955; for glanders, 2060; for pseudotuberculosis, 2064; effect of faecal flora of pigs, 2131; for bacon pigs, 2279; action on fowls, 2328; 4067; for preserving poultry carcasses, 2358; 2369; more active in feeds low in calcium, 3071; combined with colistin, 3537; effect on endocrine and digestive systems of rat and chick, 3761; potentiation by terephthalic acid, 4138.

CHLORTHIAZIDE

Diuresis in cow, 1618.

CHOLESTEROL

In blood of horses, 273; in blood of bitch, 294; blood levels raised by salt feeding, 500; in blood of pigs, 859; 863; in blood and organs of chicks, 860-1; deposits in lungs of cats and rodents, 903; in sheep adrenal, 1845; in blood of animals, 2341.

CHOLINESTERASE

see Enzymes.

CHORIOMENINGITIS, LYMPHO CYTIC

In mice, 3977.

CHROMAFFIN CELLS

In cattle and sheep, 2350.

CHRONIC RESPIRATORY DISEASE OF FOWLS

Role of pasteurella, 634; role of PPLO, 689-690; role of virus, 3989; agglutination test, 687; antibiotic control, 370; 688; experimental reproduction, 691-3; intracellular inclusion bodies, 1141; tylosin treatment, 1767; histology, 1768; transmission, 2477; role of coli bacilli, 3492; whole-blood plate test, 3554; in Bulgaria, 369; in Greece, 3370; in Spain, 2478; in U.S.S.R., 1411.

CHRY SOMYIA

see Blowflies.

CIRCULATORY SYSTEM

General ...Circulation of giraffe, 932; valves in mammary veins of goat, 1968; effect of anthrax on the circulation, 2044; haemodynamics of calves, 2343; gastric blood flow in cattle, 2346.

Arteries

Pressure in internal spermatic artery of ram, 554; aorta lesions in sea lions, 901; diseases of pulmonary arteries in horse, dog, cat, 902; experimental atherosclerosis in pigs, 1201; periarthritis nodosa in a ewe, 1334; atherosclerosis in pigeons, 1892; atherosclerosis in fowls, 1893; 3047; intimal lesions in pig, 1925; vascular lesions in copper-deficient pigs, 2281-2; cardiac vessels in sheep and goats, 2359; ion transport across walls of vessels in dogs, 2726; chronic arteritis in rats, 3046; radiography of coronary arteries in the dog, 3406; aortic sclerosis in pigs, 3729; arteries in ox, 3782; hamartias in fowl, 4060; diameter of lung capillaries in dog, 4161; anatomy in fowls, 938; 4183.

Heart

Lesions in swine fever, 119; ECG in horses, 217; 553; 1895; ECG in fowls, 1271; ECG in goats, 2344; streptococcal endocarditis in horse, 305; ECG in cattle, 4107; heart block in a cow, 515; diagnostic aids, 521; tachycardia in dogs, 522; Purkinje fibre degeneration in calves, 1905; Ca and Mg in heart muscle of pigs, 1923; round heart disease in ducklings, 2295; electron microscopy of heart muscle, 2508; recording heart activity of unrestrained dogs and cats, 2345; 3078; cardiac output of horses and cattle, 3082; 3754; radiography of coronary arteries in the dog, 3406; cardiac massage in dog, 3443; myocarditis in foot and mouth disease, 3570; neoplasms in dog, 3668; microaneurysms in calves, 3728; defect in ventricular septum in calves, 3809; neoplasms in cattle, 4057; coronary aneurysm in horse and ox, 4106.

CITRIC ACID

In blood of fowls, 3090.

CLIMATE Weather and ketosis, 506; physiological responses of buffalo calves in India, 543; and bovine mastitis, 637; indoor climate and virus survival, 793; 1507; relative humidity and bacterial survival, 1357; comparison of breeds of sheep in hot climate, 1596-7; microclimate and piglet influenza, 1810; reaction of cow to stall climate, 1996; behaviour of sheep at high altitude in Rhodesia, 3074; skin evaporation in zebu, 3076; effects on cardiac output in cattle, 3764; weather and transport tetany in cattle, 4092.

CLOSTRIDIA, GENERAL Local and general effects of cultures and toxins, 1055; lipolytic activity, 1056; polyvalent vaccine for sheep, 3189; lysis of neoplasms by *C. butyricum*, 3323; unclassified clostridia in pig intestine, 3899.

CLOSTRIDIUM BOTULINUM INTOXICATION Growth in semi-synthetic medium, 655; Type C in cattle, 1392; dialyzed adsorbed vaccine, 1393; Type E in mink, 2106; resistance to gamma rays, 2877; immunization of mink, 3261; Type E toxin, 3897; Type C in animals in Denmark, 3898.

CLOSTRIDIUM CHAUVOEI Antigenic differentiation from *C. septicum*, 3188.

CLOSTRIDIUM HISTOLYTICUM Pathogenicity for rabbits, 1055.

CLOSTRIDIUM OEDEMATIS INFECTION In sheep in U.S.S.R., 1051; general account, 1053; lipolytic activity, 1056; prophylaxis of black disease, 1749.

CLOSTRIDIUM SEPTICUM Antigenic differentiation from *chauvoei*, 3188.

CLOSTRIDIUM TETANI INFECTION Modified toxoids, 654; in dog, 1049; 2463; in kangaroo, 1389; risk from dog-bites, 1390; toxin fixed by ganglioside, 1391; identification by culture, 1751-2; placental passage of antitoxin, 1753; immunization of foals, 2105; combined vaccine against tetanus and leptospira, 2110; chlorpromazine therapy in horses, 2462; antigen assay by neutralization, 3529; uterine infection in mice, 3896.

CLOSTRIDIUM WELCHII Prototoxin of Type D, 1748; purification of toxoid, 2104; haemagglutinin, 2459; iota toxin, 2460; alpha toxin of Type A, 3894.

CLOSTRIDIUM WELCHII INFECTION Environment and incidence of C and D infections, 351; general account, 1053; enteritis in piglets, 1054; beta-propiolactone toxoid, 1750; passage of antitoxin into gut, 2461; experimental studies on enterotoxaemia in sheep, 2458; 3185-7; acute gastro-enteritis in rabbits, 3193; enterotoxaemia in cattle, 3528; fate of labelled toxin, 3895; in sheep in Near East, 2112; in Poland, 1747; in South Africa, 1388; in U.K., 3393; in U.S.S.R., 1051; in Yugoslavia, 1052.

CLOVER Oestrogen content, 1891; 3429; photosensitization in turkeys, 2323; uterine hyperplasia in sheep, 2770; effect on fertility in sheep, 3429.

COBALT Requirements and toxicity in chicks, 867; incrustation around cobalt pellets in lambs, 866; deficiency in Australia, 1310; and metabolism in sheep, 1564; deficiency in lambs, 2287; 3028; radiocobalt in sheep, 3050; amino acid compound for therapy, 3067; deficiency in ruminants in Denmark, 3342; cobalt pellets and milk production, 4073.

COCCIDIOIDES INFECTION In cattle, 664-5.

COCCIDIOSIS see Eimeria and Isospora.

COCKROACHES As hosts of hookworm, 2624.

COBRINAL see Eimeria infection.

COLISTIN Bactericidal action, 3537.

COLOSTRUM see Milk.

COMB Autoradiography and histochemistry of cock's comb, 263.

See also Blue comb disease.

COMBELEN see Tranquillizers.

CONGENITAL DEFECTS see Teratology.

CONGLUTININ see Immunology.

CONGO, REPUBLIC OF see *Mycobacterium tuberculosis* infection, general; Newcastle disease.

CONJUNCTIVITIS see Eyes.

CONTAGIOUS PUSTULAR DERMATITIS see Ecthyma, Contagious.

COOMBS TEST see Brucella infection, diagnosis.

COOPERIA Immunity of calves to *C. punctata*, 1177; survival of larvae on pasture, 1180; action of Ruelene, 2991.

COPPER Deficiency in cattle, 499; 1562; 2283; 2568; 3445; 3685; in blood of cows, 1206; metabolism in ruminant, 869; swayback, 1563; 3343; metabolism in sheep, 1564; in brain of sheep, 2182; vascular lesions in deficient pigs, 2281; 2282; influence of stilboestrol on pigs, 863; in sows milk, 2667; a deficient diet for rats, 498; deficiency in chicks, 3017; factors affecting absorption and deposition in liver, 3344; complexes of Cu and pyrrolizidine alkaloids, 3385; action on the nervous system, 3734; copper glycinate injection for sheep, 4074; poisoning in pigs, 4112-3; chronic poisoning in sheep, 1249; 4114; binding to caerulo-plasmin in different animals, 4151.

COPPER PENTACHLOROPHENATE see Molluscs.

COPPER SULPHATE Toxicity and growth promotion in pigs, 1207; poisoning in sheep, 1249; effect on faecal flora of pigs, 2131; metabolism in pigs, 2280; in pig rations, 2279; 3016; 3687; 4075; compared with sulphide in pig rations, 3686.

See also Anthelmintics; Growth factors.

CO-RAL see Coumaphos.

CORALOX see Anthelmintics, sheep.

CORPUS LUTEUM see Genital System.

CORTICOSTEROIDS see Steroids.

CORTICOTROPHIN Action on milk yield, 1283; for milk fever, 2681; influence on rabies, 2914; in shipping fever in sows, 3366; influence on sex ratio of rats, 3803; uses in pigs, 4096.

CORTISONE Influence on *Corynebact. murium* infection, 26; reduced resistance of rabbits to mucosal disease virus, 114; influence on tuberculin test, 2424; effect on trypanosomiasis in rats, 2486; and resistance to Johne's disease, 2820; and susceptibility of mice to staphylococci, 3128; inhibition of interferon, 3233; treatment as aid to testing vaccines, 3515; effect on leptospirosis in pigs, 3526.

CORYNEBACTERIA Atypical strains from cattle, 25; atypical strains from bovine mastitis, 325; in calves, 358; in aborted calves, 2113.

CORYNEBACTERIUM EQUI In horse with broncho-pneumonia, 24.

CORYNEBACTERIUM MURIUM Infection in mice, 26.

CORYNEBACTERIUM OVIS Skin lesions in monkeys, 1340; haemolytic action, 2426.

- CORYNEBACTERIUM PYOGENES INFECTION** L forms in mastitis milk, 326; abscesses in sheep, 586; bovine mastitis, 1339; variant strains from genitals of cows, 1691; mastitis in sows, 1763; liver abscesses in cattle, 1916; in bulls, 3481; lesions in slaughtered pigs, 3862.
- CORYNEBACTERIUM RENALE INFECTION** Incidence in cattle, 3862.
- CORYNEBACTERIUM SUI** Infection in pigs, 2427.
- CORYZA, AVIAN** Oxytetracycline therapy, 3151.
- COUMAPHOS** see Anthelmintics; Parasiticides.
- COXSACKIE VIRUS** In monkeys, 1455.
- CREATININE** In urine of pigs after rail transport, 2722.
- CROP** see Digestive system.
- CROTALARIA** see Poisoning, plants.
- CRYPTOCOCCUS NEOFORMANS INFECTION** In cat, 2470; in kaola, 4091.
- CRYPTORCHIDISM** see Genital system, testicle.
- CULICOIDES** A bibliography, 3290.
- CYANACETHYDRAZIDE** For lungworms, 158; 1183; 1185; 1867; 2642; 2643; 3003; 3313; 3559.
- CYANOCOBALAMIN** see Vitamin B 12.
- CYSTICERCUS** see Taenia.
- CYSTOCAULUS** In sheep in U.K., 4048.
- CYTOMEGALY** Cytomegalic virus in rats, 2201; cytomegaly in salivary glands of rats, 2703.
- CZECHOSLOVAKIA** see Brucella infection, swine; Encephalomyelitis, bovine; Encephalomyelitis, porcine; Fasciola; Helminth parasites, fowls; Influenza, swine; Leptosira infection; Rhinitis, porcine.
- DAMALINIA** Development on sheep, 1838.
- DDT** see Parasiticides.
- DDVP** see Parasiticides.
- DEER** Haemorrhagic virus disease, 2179; 2951; causes of death, 2292; malignant catarrh, 2950; cerebral nematodiasis, 4050; housing and feeding, 4204.
See also Brucella infection; Fascioloides; Leptosira infection; Mycobacterium tuberculosis infection; Toxoplasma infection.
- DELNAV** see Parasiticides, general.
- DEMODOX** see Mange.
- DENMARK** see Brucella infection; Clostridium botulinum; Cobalt; Leucosis; Myxomatosis; Salmonella pullorum infection.
- DERMANYSSUS** Lethal action of silica aerogel, 2592.
- DERMATITIS, CONTACTIC PUSTULAR** see Ecthyma, Contagious.
- DERMATITIS, MYCOTIC** see Dermatophilus.
- DERMATOBIA** see Oestridae, Dermatobia.
- DERMATOPHILUS** Skin lesions in zebra and donkeys, 1067; cutaneous streptothricosis in Africa, 1406; cutaneous streptothricosis in cattle and goats, 2127-8.
- DIABETES** Carbutamide therapy in dog, 504; in cattle, 1572; produced in cat by pituitary hormones, 3355.
- DIAMPRON** For bovine piroplasmiasis, 2146; for Babesia infection, 3208.
- DIARRHOEA** see Digestive system, diseases.
- DIARRHOEA, BOVINE VIRUS** In Sweden, 422; in Australia, 1464; neutralization test, 1465; virus related to swine fever virus, 1806; vaccines, 2535; compared with virus of mucosal disease, 2930-1; comparison of American, British and German viruses, 3957.
- DIARRHOEA, MURINE VIRUS** Neutralizing antibodies, 3975.
- DICHLOROPHEN** see Anthelmintics.
- DICROCOELIUM** In cattle in Ireland, 464; toxicity of antigens, 1164; treatment for sheep and cattle, 1530.
- DICTYOCALUS** Viviparus in guinea pigs, 1184; immunization of lab. animals against viviparus, 2247.
See also Lungworms.
- DIELDRIN** see Parasiticides.
- DIETHYL-CARBAMAZINE** For lungworms, 1183; 2462; for flukes, 1530; for Nematodirus in sheep, 1859; anthelmintic for pigs, 3313.
- DIETHYLSTILBOESTROL** see Sex hormones, oestrogens.
- DIGESTIVE SYSTEM**
Crop Microflora in fowls, 1075; antimicrobial activity in fowls, 2384; pendulous crop in turkeys, 1232.
Diseases, general Swine dysentery, 354; causes of porcine gastro-enteritis, 361; 1018; 4211; lesions in proventriculus of duck, 1863; new bactericidal compound, 3069.
Gizzard Grit size and digestion, 2664; passage of barium meal, 4169.
Intestines (physiology) Flora in pig, 13; 2131; 3203; 3899; 3918; absorption of small labelled particles, 1609; 2720; absorption of polystyrene latex particles, 2349; nitrogen compounds in duodenum of sheep and camel, 1613; absorption in young rat, 1964; histological artefacts, 1975; caecal fauna of rats, 2150; carbohydrases in pig, 2336; flow of digesta in sheep and goat, 2347; lymphoid aggregates in rabbit, 2364; antimicrobial activity in alimentary tract of fowl, 2384; absorption during helminth infection, 2621; permeability in calves, 2738; hypertrophy from antibiotics, 3751; absorption of minerals in cow, 3775; development of bacterial flora in calf, lamb, rabbit, 3918; transport of Ca in rat, 4165; permeability to plasma albumin in sheep, 4168; passage of barium meal in chicks, 4169.
Intestines (diseases) Aspergillus diarrhoea in colts, 672; ulcerative enteritis in fowl and quail, 1003; 2059; coli diarrhoea in piglet, 1704; 2833; procaïne for diarrhoea in piglet, 2695; dilatation of bovine caecum, 1242; obstruction in horse, 1576; stenosis in chick, 1583; enteritis in turkeys, 2059; 2307; entero-colitis in chinchillas, 2827; shigella enteritis in ducklings, 2835; enteritis in rabbit, 3339; enteritis caused by Echinocasmus in pigs, 3646; proliferation of Teschen virus in pig, 3968.
Mouth Papilloma in dog, 776-7; stomatitis in snake, 3150.
Oesophagus Pressure in cow, 1274; stenosis in foal, 3285; passage of liquids in animals, 3770.
Ruminant digestion (general) Structure and function of omasum, 1275; development of stomachs in calf, 1278; development of stomachs in sheep, 1608; pigmented epithelium of stomachs in cattle, 3773; comparison of European and zebu cattle, 4164.
Ruminant digestion (diseases) Colic in cow, 885; dilatation of bovine caecum, 1242; ruminal atony, 1266; atony of forestomachs in cattle, 1577-9; abomasal dilatation in cattle, 2687-8.
See also Tymanitis.
Ruminant digestion (flora and fauna) Streptococcus bovis, 12; metabolism of Entodinium, 92; effect of penicillin, 371; cultivation of oligotrichs, 391; bacteria and bloat, 1558; changes during atony of forestomachs, 1579; development of fauna in lamb, 1617; new Bacteroides from sheep rumen, 2481; ammonia-producing bacteria, 2482; yeasts, 2883; effect of cobalt deficiency, 3028; influence of various drugs on infusoria, 3215; action of excess starch, 3682; Actinobacillus lignerisi in rumen, 3910.
Ruminant digestion (metabolism) Fermentation balance in rumen, 933; artificial rumen, 975; glucose and casein metabolism, 1204; quantitative aspects, 1273; abomasal secretion in sheep, 1277; feeding lactose to sheep, 1560; synthesis of vitamins, 1569; production of methane from formic acid, 1610; phosphorus metabolism in sheep and camel, 1611; propionic acid and abomasal secretion, 1974; cellulose fermentation, 3084; absorption of amino acids, 3684; metabolism of Ca and Mg, 4165-7.
Ruminant digestion (physiology) Nervous regulation of rumination, 257; source of efferent fibres to stomach, 270; pressure in oesophagus, 1274; passage of fluid through omasum, 1276; absorption of small labelled particles, 1609; nervous regulation in sheep and camel, 1612; stimulant action of plant extracts, 2326-7; opal phytoliths in rumen, 2338; 3771-2; gastric blood flow in cattle, 2346; absorption of organic acids from omasum, 2348; rumen function in unweaned calves, 2737; acid secretion by abomasum of sheep, 2739; rumination and frequency of feeding, 3012; book on ruminant digestion, 3119; 3451; bulbar reflex control of the reticulum in lamb, 3409; effect of cold ingesta, 3676; flow in oesophagus, 3770; secretion of acid by abomasum of sheep, 3774; action of intravenous sodium salts, 4163.
Stomach Contractions in piglet, 258; carcinoma in horse, 1190; necrosis in starved and aged mice, 2660; ulcers in pig, 1176; 1926; 3365.
Tongue Necrotic glossitis in cattle, 3361.
- DIHYDROCODEINE** Used on dogs and cats, 1263.
- DIMETHOATE** see Parasiticides.
- DINGO** see Wild Animals.
- DIOCTOPHYME** Lesions in dogs, 3004.
- DIPETALONEMA** In kangaroo, 1188; vital staining in dog blood, 1189; in dog, 1877; 2649; 4055.
- DIPHENYL-PARA-PHENYLENEDIAMINE (DPPD)** see Anti-oxidants.
- DIPLOCOCCUS** see Streptococcus pneumoniae.
- DIPS & DIPPING** Death in sheep dipped in arsenic, 1588.
See also Parasiticides.
- DIPTERA** Transmission of salmonella, 1714.
See also Blowflies; Glossina; Melophagus; Mosquitoes; Musca; Oestridae; Simulium; Siphona; Stomoxys.
- DIPTEREX** see Trichlorophen.
- DIPYLIDIUM** Yomesan treatment, 1165-7; D. caninum in children, 1532.
- DIROFILARIA** In dog in U.S.A., 1877; 2649; 4055; vital staining in dog blood, 1189; larval stages in dog, 2650; treatment with dithiazanine, 3319; 3667; in dog in Italy, 3666.
- DISEASES, GENERAL** Book on veterinary medicine, 295; economics of animal health, 880; measures to detect exotic diseases, 1222; food losses through animal disease, 3359; African veterinary handbook, 3453; FAO/OIE Animal Health Year Book, 4089.

DISINFECTANTS, ANTISEPTICS & STERILIZATION For helminth eggs in soil, 162; formaldehyde for F & M virus, 395; Tego-51 against tubercle bacilli, 616; disinfection of skin with chlorhexidine or iodine, 924; action of strongyloid larvae, 2618; hatchery sanitation, 2757.

DISPENHOL see Anthelmintics, dogs.

DISTEMPER, DOG Efficacy of avianized virus, 129; tissue culture of virus, 130; 436; 3970; cross-immunity with rinderpest, 131; 450; 773; 1116; 2401; 3972; comparison with measles virus, 132; 774; 1131; 1812-3; 2401; testing vaccines, 772; 2968; aerosol infection, 1130; vaccine against hepatitis and distemper, 1488; immunization, 2192; vaccine against distemper, hepatitis and leptospirosis, 2193; corticosteroid therapy, 2194; recovered dogs resist rabies, 2518; in France, 2946; in fox and raccoon, 2949; complicating virus hepatitis, 3259; immunization of mink, 3261; vaccine from cultured virus, 3603; virus not related to rabies virus, 3604.

DITHIAZANINE see Anthelmintics.

DIURESIS see Urinary system.

DODINE Toxicity, 2318.

DOGS

General Longevity and mortality of four breeds, 925; acetoxyprogesterone stops oestrus, 957.

See also Radiography; Surgery.

Anatomy see Anatomy; Pineal body.

Arthropod parasites see Mange; Ticks.

Bacterial and fungal diseases see Bacterium friedländeri; Blastomycosis infection; Brucella infection; Brucella tularensis infection; Clostridium tetani infection; Escherichia coli infection; Fungi, diseases; Histoplasma; Listeria monocytogenes; Mycobacterium tuberculosis infection; Salmonella infection; Staphylococci.

Diseases, general Mediastinal syndromes, 524; spondylosis deformans in Boxer, 579; book on orthopaedic surgery, 598; mortality in puppies, 1815; ragweed allergy, 2218; spondyloarthritis, 2696; Von Gierke's disease in puppies, 2697; haemorrhagic hepato-nephritis in Tunisia, 3722.

See also Adrenal gland; Blood, diseases; Bones; Circulatory system, diseases; Diabetes; Ears; Eyes; Kidneys, diseases; Leucosis; Magnesium; Neoplasms; Pancreas; Poisoning, organic poisons; Potassium; Respiratory System; Vitamin D.

Helminth parasites see Helminth parasites, dogs.

Nutrition see Nutrition, dogs.

Physiology Book on reproduction, 298.

See also Circulatory system, heart; Genital system, cervix; Kidneys; Lactation; Parathyroid gland; Respiratory system, lungs; Skin, general; Teeth.

Protozoal diseases see Babesia infection; Giardia; Isospora infection; Pneumocystis; Toxoplasma infection.

Viral and rickettsial diseases Attempts to infect with Newcastle disease virus, 1601; corticosteroid therapy for virus diseases, 2194.

See also Distemper; Encephalitis, Tick-Borne; Hepatitis, canine; Rabies; Rhino-tonsillitis, canine.

DOPING A review, 2755.

DOVES see Wild Animals.

DOWCO COMPOUNDS see Parasitocides.

DOW ET-57 see Ronnel.

DUCK PLAGUE In the Netherlands, 785-6; 3991.

DUCKS Infectious sinusitis in ducklings, 448; round heart disease in ducklings, 2295; shigella enteritis, 2835; list of parasites, 3278.

See also Amidostomum; Anatomy; Bilharziella; Duck plague; Encephalomyelitis, equine; Fowl paralysis; Hepatitis; Influenza, virus; Insemination, Artificial; Leeches; Metorchis; Muscular dystrophy; Neoplasms, general; Pasteurella infection; Pasteurella pseudotuberculosis; Psittacosis; Trichomonas infection; Tetrameres.

DUODENUM see Digestive system, intestine.

DWARFS Sensitivity of dwarf cattle to insulin, 3807.

DYSTROPHY, MUSCULAR see Muscular system.

EARS Notoedric mange in cats, 463; Pityrosporum yeasts in dogs, 668; fungi in ears of dogs, 1404; streptococcal otitis in pigs, 3842.

EARTHWORMS As carriers of Newcastle disease virus, 1821.

EAST COAST FEVER see Theileria parva infection.

ECHINOCASMUS Enteritis in pigs, 3646.

ECHINOCOCCUS In Kenya cattle, 813; in Turkey, 816; treatment of dogs in Turin, 817; incidence in pig, 1534; in Yugoslav cattle, 1848; in Ceylon jackal, 2240; bibliography, 2614; histochemical reactions, 2615; in cattle and sheep in Australia, 2616; in horse in Italy, 3301; in cattle, sheep and pig in Tunisia, 3302; hyperplasia of cysts in sheep and cattle, 3303; intraperitoneal cysts in sow, bitch

and cat, 3304; incidence of cysts in cattle, sheep and pig in New Zealand, 3648-9.

ECONOMICS see Statistics.

ECTHYMA, CONTAGIOUS Chloramphenicol therapy, 1125; severe form in lamb, 2538.

ECTROMELIA see Pox diseases.

ECZEMA see Skin, diseases.

EDUCATION Report of FAO meeting, 563.

EGGS, DUCK Chloride dips improved hatchability, 1648.

EGGS, HEN Salmonella infection, 54; 1027; 2084; factors influencing shell, 545; residues of DPPD, 561; minerals in shell gland of laying hens, 1287; residues of coumaphos, 1992; discoloration by gossypol, 1994; Toxoplasma in eggs, 2148; effect of yolk on virus vaccine, from eggs, 2206; role in aspergillosis, 2471; 3903; nutrition and hatchability, 2662; shell thickness, 2740; hatchery sanitation, 2757; coli infection and susceptibility to virus infection, 2955; dipped in sex hormone solutions, 2967; mineral content, 3092; lindane residues, 3291; position of embryo, 3401; effects of thyroxine given in food, 3781.

EGGS, TURKEY Parthenogenesis, 1643; 2003; 2211.

EGYPT see Brucella infection, sheep and goats; Eimeria infection; Foot and Mouth disease; Pox diseases, sheep pox; Salmonella infection, horses.

EIMERIA INFECTION (COCCIDIOSIS)

General Staining oocysts by Ziehl-Neelsen's method, 380; in wild mammals, 1421; E. pelleri in camel, 1421; in pig in Egypt, 3559; in guinea-pig, 3560; culture of oocysts, 3931.

Avian Studies on E. tenella oocysts, 88; nitrofurazone in drinking water, 378; four coccidia compared, 702; role of vitamin A, 89; vitamin A prophylaxis, 704; acervulina infection, 705; excystation of acervulina, 3929-30; in turkeys, 706; effect on food and water intake, 1082; effect on adrenal ascorbic acid, 1083; vaccine in drinking water, 1084; E. brunetti in Hungary, 1423; role of vitamin K, 1773; 2144; in rabbits, 2141; immunity to E. tenella, 2489; 2897; synergy of Eimeria and Plasmodium, 2898.

Cattle Oocyst production in subclinical infection, 699; treatment, 1422; in Spain, 2895-6; auburnensis in calf, 3925.

Sheep and goats In goats, 377; oxytetracycline therapy in sheep, 700.

Treatment Codrinal for fowls, 379; dinitro-ortho-toluamide against E. tenella, 703; nitrofurazone and sulphadimidine for cattle, 1422; sulphonamides for rabbits, 1774; Trithiadol and glycarbylamide for fowls, 1775; Zoalene in food or water, 1776; nitrophenide plus chlortetracycline, 1777; nitrofurazone, furazolidone and sulphaquinoxaline for rabbits, 2141; nicarbazin for fowls, 1775; 2142; 2897; 3068; amprolium for fowls, 2143; sulphonamides in E. necatrix infection, 2490; sulphonamides for fowls, 2490; 3561; nitrofurazone and furazolidone for fowls, 2897; 3927; tenella resistant to Zoalene, 3926; framycetin-menaphthone complex for fowls, 3928.

ELAPHOSTRONGYLUS In brain of reindeer, 1861; in deer, 4050.

ELECTROCARDIOGRAPHY see Circulatory system, heart.

ELECTROENCEPHALOGRAPHY see Nervous system, brain.

ELECTRON MICROSCOPY see Technique.

ELECTROPHORESIS see Technique.

ELEPHANTS see Helminth parasites; Neoplasms, general; Salmonella infection.

EMBRYOS, DUCK Book on the avian embryo, 2034.

EMBRYOS, FOWL Lesions caused by fowl pox, 101; non-specific lesions of chorio-allantois, 207; use in protozoology, 390; action of radiations, 1649; 2751; pock-like chorio-allantoic lesions, 1833; bone matrix, 1977; book on the avian embryo, 2034; propagation of rinderpest virus, 2924; position of embryo in egg, 3401; Staphylococcus infection, 3837; pathogenesis of viral infection, 3992; action of cells from adult fowls, 4001.

EMBRYOS, MAMMALIAN Separation of penis from sheath in cattle, 271; factors controlling growth, 546; growth of digestive organs in sheep, 547; experimentally induced mortality in rabbits, 958; mortality in deer mice, 959; development of skin in cattle, 1599; development of stomachs in sheep, 1608; mortality in ewe, 4201.

EMPHYSEMA see Respiratory system.

ENCEPHALITIS see Nervous system, brain.

ENCEPHALITIS, JAPANESE In pig and sheep in China, 1453.

ENCEPHALITIS, TICK-BORNE Antibodies in cattle, sheep and goat, 415; tissue culture, 416; in a dog in Sweden, 741; role of lymphatic system in sheep, 742; pasteurization of milk, 1107.

ENCEPHALOMALACIA In sheep, 887.

ENCEPHALOMALACIA, AVIAN Accelerated by keto acids, 192; sex incidence, 454; in chicks fed fats, 564; role of lipohydroperoxide, 1906.

ENCEPHALOMYELITIS, ALLERGIC see Nervous system, diseases.

- ENCEPHALOMYELITIS, AVIAN** In Austria, 746; neutralization test, 747; epidemiology, 2569; control and vaccines in U.S.A., 2570; 2571; in Greece, 3370; properties of virus, 3989.
- ENCEPHALOMYELITIS, BOVINE SPORADIC** In Australia, 1463; 3956; in Slovakia, 2533.
- ENCEPHALOMYELITIS, EQUINE** Tissue culture diagnostic test, 3234; use of pigeons for assessing incidence of virus, 3585; EEE in Argentina, 106; antibodies in wild ducks, 107; 3235; in ducklings, 748; virus overwintered in snakes, 749; 1454; electron microscopy, 1108; chick test for virus in mosquitoes, 1109; virus neutralization by ticks, 1110; in U.S.A., 1796; action of interferon on virus, 2172; EEE in turkey, 2173; in horse in British Guiana, 2522; tissue culture of virus, 2523; 2525; detection of virus in air, 2524; in horse in Brazil, 2754; in wild animals, 2949; tissue-culture vaccine, 3955.
- ENCEPHALOMYELITIS, PORCINE (TESCHEN DISEASE)** Diagnosis by tissue culture, 124; histopathology of Teschen disease, 430; German studies, 1807; intracerebral infection with Teschen virus, 1808; electron microscopy of virus, 1809; adjuvant vaccines, 2543-4; vaccines, 2552-5; influence of nutrition on infection, 2545-6; antibodies in colostrum, 2548; inspection of carcasses, 2549; cerebrospinal fluid, 2550; mixed Teschen and erysipelas vaccine, 2556; attenuation of virus, 2557; tissue culture of virus, 1809; 2939; 3252; viral growth in gut of pig, 3968; in Canada, 2940; in Czechoslovakia, 2547; in East Germany, 429; in Madagascar, 2187; in Poland, 2551.
- ENCEPHALOMYOCARDITIS** Virus in pigs, 2188; 2941.
- ENDOMETRITIS** see Genital system, uterus.
- ENDOTOXIN** Action on mice, 2118; body temp. and lethal action of endotoxin, 2939; mechanism of shock, 3494; reduces iron content of rat blood, 3535; elicits bactericidal antibodies, 3538; different action in different species, 3870; non-bacterial endotoxins not found, 1402.
- ENDRIN** see Parasiticides.
- ENTAMOEBIA INFECTION** Metronidazole therapy in mice, 3940.
- ENTERITIS, FELINE** Blood picture, 2195; nature of Bolin's virus, 2561.
- ENTERITIS, MINK** Immunization, 2197-8; 3261.
- ENTEROBACTERIACEAE** Biochemical methods for differentiation, 45; sugars of O antigens, 48; biochemistry of Australian strains, 1358.
- ENTEROTOXAEMIA** see Clostridium welchii infection.
- ENTEROVIRUSES** From pig, 125; 771; 1487; 2945; 3258; 3602; 3968; from cattle, 424; 1472; 3244; 3268; 3964; in milk, 1472; tissue culture, 452; related to bovine rhinotracheitis virus, 1119.
- ENTROPION** see Eyes.
- ENZOOTIC ATAXIA** see Swayback.
- ENZYMES** Cholinesterase in r.b.c. of sick pigs, 870; enzymes in blood of lambs, 888; lysozyme in bovine serum, 1096; pyrophosphatase and ribonuclease in blood of cattle, 1265; adenosine triphosphatase in blood of cattle, 1266; nucleotidase in white muscle disease, 1570; plasma esterases in pig, 1946; glucose phosphatase in sheep, 1963; cholinesterase in rat, 1964; enzymes in cow liver, 1984; in muzzle of sheep and adrenal of pig, 2335; intestinal carboxydases in pig, 2336; diamino-oxidase in cow serum, 2761; leucineamidase in pig serum, 2942; alkaline phosphatase in fowl, 3341; cholinesterases in cattle, 3749; glycosidase in corpus luteum, 4179.
- EPERYTHROZOON** In cat, 372; in sheep in U.K., 2888; enhances choriomeningitis in mice, 3609.
- EPIDIDYMITIS** see Brucella infection, sheep; Genital system, testicle.
- EPIZOOTIC LYMPHANGITIS** see Histoplasma farcinum.
- ERGOT** Milk-ejecting action, 531; ataxia in cattle, 2661; oxytocin plus ergometrine in obstetrics, 3390.
- ERYSIPELOTHRIX MONOCYTOGENES** see Listeria monocytogenes.
- ERYSIPELOTHRIX RHUSIOPATHIAE** Properties of haptens, 328; agglutination by normal horse serum, 1007; Type X, 1341; variability of avirulent strains, 1695; L forms, 2062; haemagglutinin, 2429; phage typing, 2821.
- ERYSIPELOTHRIX RHUSIOPATHIAE INFECTION (SWINE ERYSIPELAS)**
General Possibility of eradication, 27; 624; in tonsils of healthy pigs, 28; Staub's avirulent strain, 29; 30; treatment of mice with oxytetracycline, 31; immunity after penicillin treatment of mice, 32; in wild pigs, 327; joint infection, 1342; orchitis in hare, 1343; pathogenesis of arthritis, 2061; bacteriological diagnosis in pigs fed antibiotic, 2120; rheumatoid syndrome, 3721.
Immunology Trial of freeze-dried Staub's vaccine, 825; immunization by virus plus culture method, 1005; 1693; comparison of live vaccines, 1008; serological tests for susceptibility, 1694; combined vaccines, 1837; 2556; gamma globulin from pig, 2119; live avirulent vaccine, 2428; tests for antibodies, 3144; test for vaccines, 3486; vaccine from Group B variants, 3486; growth-inhibition test, 3487; Roumanian attenuated vaccine, 3864.
- ERYTHROBLASTOSIS, AVIAN** see Fowl paralysis.
- ERYTHROLEUCAEMIA, AVIAN** see Fowl paralysis.
- ESCHERICHIA COLI** Resistance to antibiotics, 43; 858; phage infection, 44; strains from pig, 638; sugars in O antigens, 1021; toxin, 2070; action of animal strains on rabbit gut, 2071; haemolysin, 2072; cultures inhibited by sex hormones, 2116; non-intestinal pathogenic strains, 3493; in digestive tract of young animals, 3918.
- ESCHERICHIA COLI INFECTION**
General Endotoxin shock, 639; 3154; 3494; action of endotoxin, 1351-2; 3870; uterine defences, 1353-6; relative humidity and mortality, 1357; causing infertility in goat, 1703; respiratory infections in fowl, 1707; 3492; endotoxin stimulates antibody formation, 1708; serology of human infection, 2074-5; mastitis in sheep, 2115; septicaemia in dog, 2834; effect on virus infection of eggs, 2955; lab. diagnosis, 3153; in mink, 3369; experimental kidney infection, 1020; 3871.
Cattle Mastitis, 41; 637; 1016; 2114; antibiotic-resistant strains, 858; calf septicaemia, 42; 1017; paresis in cow, 1349; abortion in cow, 2113; blood therapy for calf, 2832; brain lesions in calf, 3536.
Swine Oedema disease, 638; 1018-9; 1705-6; hypersensitivity, 1018; puerperal sepsis, 1350; strains in unweaned pig, 1704; neuro-oedema toxin of E. coli, 2070; gastroenteritis, 2438; 2833.
- ESCHERICHIA FREUNDII** In turtle, frog and rabbit, 3869.
- ETHIDIUM** Action on trypanosome extracts, 86; for ovine keratoconjunctivitis, 2830; suramin complex, 2889.
- ETHIOPIA** see Pleuropneumonia, caprine; Rinderpest.
- EXANTHEMA, COITAL VESICULAR** In bull, 2002; the virus of coital vesicular exanthema, 1470; 1801; in mare, 2431; in cattle in Belgium, 2769; relationship to foot and mouth disease virus, 3577.
- EXANTHEMA, PORCINE VESICULAR** Tissue culture method for diagnosis, 451; c.f. and agar diffusion tests, 2943.
- EXUDATIVE DIATHESIS** see Haemorrhagic syndrome.
- EYES** Tumours in dog and cat, 845; cataract in fowl, 898; micro and macrophthalmia in piglet, 1302; conjunctivitis in avian laryngotracheitis, 1504; lesions in bovine malignant catarrh, 1799; Newcastle virus not in aqueous humour, 1820; Thelazia conjunctivitis in horse, 1875; cataract in dog, 1929; chronic keratitis in dog, 2311; ophthalmia in sheep, 2585; entropion in cattle, 2690; red tears in rat, 2703; viral conjunctivitis in calf, 2929; melanoma in goat, 3005; lesions in vitamin-deficient calf, 3026; effect of continuous light on fowl, 3778; blindness from vitamin A deficiency, 4083; book on animal vision, 4218.
See also Keratoconjunctivitis, bovine; Thelazia.
- FACIAL ECZEMA** In Australia, 238; action of toxin on rabbits, 239; 1949; spore counts on pastures, 3196.
- FAECES** Survival of Histomonas meleagridis, 1772; role in transmitting helminths of cattle, 1851; excretion of radio-iodine by cattle, 1935; androgens in cow dung, 2376; collection from ewes, 2387; method for separating helminth eggs, 2651; phosphorus metabolism in sheep, 2672; identification of plants in faeces, 2778.
- FARCY** see Nocardia.
- FARM BUILDINGS** For poultry, 942; piggery ventilation, 564; climate in broiler houses, 1960; bibliography on buildings for cattle, 1995; climate in byres, 1996; ventilation, 1997; ventilation of broiler houses, 2756; 3514; shelters from heat for cows, 4185; heat for piglets, 4186.
- FASCIOLA** In horses, 465; 3640; in Kenya cattle, 813; in sheep in Czechoslovakia, 1527; in cattle and sheep in Norway, 2785; in Swiss cattle, 1844; F. gigantica in Turkey, 1528; diagnosis by faecal examination, 805; pathology in goats and cattle, 1160; changes in adrenals of infected sheep, 1845; immunization of sheep, 1878; flies parasitic on snail host, 1846; snail host in Japan, 1529; action of sodium pentachlorophenate on miracidia, 466; viability of metacercariae, 806; destruction of snail host, 807; bithionol treatment, 149; 2233; hexachlorophene treatment, 805; 2233; 3297; hexachloroethane treatment, 808; 1526; bis (trichloromethyl) benzene treatment, 809; 810; 2234; carbon tetrachloride treatment, 2608; 3641; carbon tetrachloride plus hexachloroethane, 1159; drugs tested against immature flukes, 1160; diethylcarbamazine and Entobex treatment, 1530; mepacrine for migrating flukes, 2609; fatal infestations in sheep, 2610; intradermal test on cattle, 2232; microperipartin test on serum, 3643; intradermal test for F. gigantica in cattle, 2983; effect of gigantica on growth of lambs, 3642; penetration into liver, 2984; acute infestation in nutria, 3298; eosinophilia in g.pigs, 3299.
See also Molluscs.

FASCIOLOIDES Pigment in *M. magna* and in infested cattle, sheep and deer, 1161.

FATS Incorporated into animal foodstuffs, 2663; yellow fat in bacon pigs, 178; lipids of dog skin, 3763; lipids in horse blood, 273; lipids in ox blood, 3333.

FATTY ACIDS Anti-tumour activity, 489; metabolism in perfused bovine liver, 505; in ketotic ewes, 1573; in new-born lambs, 1985; absorption from omasum, 2348; in semen, 2741; formation from cellulose, 3084; and disease in pigs, 3334.

FEATHERS As source of salmonella, 52; abnormal in zinc-deficient turkeys, 3020.

FELINE ENTERITIS see Enteritis, Feline.

FENCHLORPHOS see Ronnel.

FENUGREEK see Poisoning, plants.

FERTILITY

General Effect of obstructing portal vein on reproduction in rats, 935; foetal deaths in horses, 2011.

Cattle and buffaloes Enhanced by progesterone, 293; fertility of buffaloes, 555; influence of vitamin D3, 573; frequency of ejaculation, 945; effect of liver disease in cow, 956; effect of Ca/P ratio, 1213; ejaculatory reflexes and sex drive in bulls, 1629; after hormone injections, 2014; related to beta-globulin type, 3436; prenatal mortality, 3437; gonadotrophin increases twinning, 3440; influence of minerals in pasture, 3688; related to DNA content of bull semen, 4175.

Sheep Time of year and ovulating hormone, 952; advantages of autumn mating in Australia, 1292; super-ovulation, 1637; egg transfer, 1638; in flocks with contagious epididymitis, 1735; effect of light, 2767; puberty in ewes, 2768; in the Rhodesian high veld, 3074; effect of clover oestrogens, 3429; the use of vasectomized rams, 4192; use of progesterone, 4193; effect of feeding on clover, 4194; in hot climate, 4201.

Swine Nutritional aspects, 2266-7; general account, 3438.

FERTILIZERS Influence on Mg in herbage, 3021.

See also Salmonella group.

FIBROMA see Neoplasms.

FILARIOIDES *F. muisi* in dogs, 480.

FINLAND see Cattle, virus diseases; Foot & mouth disease.

FISH MEAL see Nutrition, fowls; Salmonella group.

FISTULOUS WITHERS Radiographic study, 481; role of *Onchocerca*, 1167; role of brucella, 2844-5.

FLAVOBACTERIUM From cows with mastitis, 2114.

FLAVOFUNGIN For pneumonocystis in chicks, 1405.

FLIES see Diptera.

FLUORESCENT ANTIBODY Applications of the method, 2386; 3999.

See also Brucella infection; Leptosira infection; Leucosis, cattle; Neoplasms, fowls; Newcastle disease, virus; Plasmodium infection; Psittacosis; Rabies, diagnosis; Sporotrichum; Toxoplasma infection.

FLUORESCENT MICROSCOPY see Technique, microscopy.

FLUORINE Deposition from fertilizer factories, 229; toxic principle of ratbane, 527; bone lesions in cattle, 3058; metabolism of radiofluorine in cattle, 3379; fluorocitrate poisoning in rats, 3737; sodium fluoride and calcium metabolism, 3738.

FOETUSES Delayed hypersensitivity, 142; carbohydrate metabolism in lambs and monkeys, 940; intra-uterine transmission of influenza virus, 1795; strontium in sheep, 1934; 3372; mummified calves, 2382; adrenal function in sheep, 3417; blood group factors in cattle, 3761; 4159.

FOOD & AGRICULTURE ORGANIZATION (FAO) Meeting on haemorrhagic septicaemia, 36; Far East meeting on animal health, 202; report on bovine contagious pleuropneumonia, 367; eleven years' work, 508; meeting on vet. education, 563; European commission on foot and mouth disease, 718; Near East meeting on animal health, 1644; meeting on African horse sickness and African swine fever, 2528; report on horse sickness vaccine, 2529; report on Amazon Valley (Brazil), 2754; report on horse sickness, 3586; report on Paraguay, 3711; diagnosis handbook, 3713.

FOOD HYGIENE

General Salmonella in meat, 640; 1482; brucella in meat, 645; 1370; report on food poisoning in England, 1027; insecticide residues in meat, 2762.

Meat inspection Tuberculous lymph nodes in pigs, 21; effect of antibiotic residues on bacteriological tests, 276; salmonella in rabbits, 1024; brucellosis, 1036; kangaroo meat, 1188; 3499; hydraemia (anasarca) in cattle, 1290; book on German law, 1666; 4218; bacteriological examination of horses, 1988; salmonella in poultry-processing plant, 2842; inspection of poultry, 3786.

Preservation Irradiated foods, 2299; 2877; 2300; antibiotics and keeping quality of poultry meat, 862; chlortetracycline for poultry, 2368-9.

FOOT Bumblefoot in fowls, 493; dermatosis vegetans in pigs, 2020; inherited deformity in fowls, 2021; ulceration of sole in cattle, 2691.

FOOT & MOUTH DISEASE

General General account, 510; problems caused by new

types of virus, 392; air-borne transmission, 394; 1785; disinfection of railway trucks, 395; viraemia in mice, 401; in Africa, 93; in Bechuanaland, 3114; in Egypt, 717; in Finland, 1431; in France, 2504; in Nyasaland, 2396; in Pakistan, 716; in Rhodesia, 3446; in U.S.S.R., 393; epidemiology and prophylaxis in Europe, U.S.S.R., Middle East and the Americas, 2151-4; report of European Commission, 718; control in American continent, 719; rules for import of cattle, 721; histopathology in mice, 734; increase in serum lysozyme, 1096; changes in hypothalamus and pituitary of infected pigs, 1484; in man, 1508; 3576; atypical infection in Slovakia, 1783; transmission by arthropods, 1784; electron microscopy of heart lesions, 2508; research in U.K., 2783; different susceptibility of two strains of mice, 3217; pathogenesis of myocarditis, 3570; treatment with thyroxine, 3569.

Immunology Avianized virus in cattle, 96; beta-globulin antibody in g.pigs, 396; immunization of pigs, 400; 1788; 1837; 3575; immune-adherence phenomenon, 720; concentration of hyperimmune serum, 722; lapinized virus vaccine, 723; tissue culture vaccine, 398; 724-5; 3219; vacuum-dried adsorbed vaccine, 727; immunity in vaccinated cattle, 728-730; duration of immunity from trivalent vaccines, 731; vaccination in the Netherlands, 1093; Polish chinosol vaccine, 1100; methods of testing vaccines, 1436-8; testing vaccines on cattle, 732; 1440; standard vaccines, 1439; comparison of c.f. and neutralization test, 1786; conglutinating complement adsorption test, 2155; gel diffusion test on immunized cattle, 2506; serum proteins of immunized cattle, 2906; antibodies in milk after udder infection, 3216.

Virus Inactivation, 94; 1098; purification, 397; 1432; tissue culture, 398; 1433-4; 1787; 2156-7; 2507; 3573; multiplication within cells, 2505; tissue culture colour test, 2905; cytopathic action, 2908; 3943; adaptation to central nervous system of mice, 95; 1097; typing strains by the viraemic reaction of mice, 402; titration in baby mice, 3571; proflavine and virus synthesis, 403; resistance of cultured virus to cold, 726; multiplication in heart muscle, 733; atypical European strains, 1094; persistence in kidney and blood of cattle, 1095; ribonucleic acid, 1099; attenuated strains, 1435; aerosols of virus, 1785; diffusion coefficient and particle size, 2158; mouse-adapted virus in calves, 2904; choice of strain for making vaccines, 2907; survival in meat, 2909; avianized Venezuelan Type O strain, 3218; typing by precipitin reaction on glass-fibre paper, 3220-1; comparison of Type O strains, 3222; indirect neutralization test, 3572; propagation in chicks and eggs, 3574; relationship to coital vesicular exanthema virus, 3577; inhibition by fluorophenylalanine, 3942; concentration by gel filtration, 3997.

FOOT ROT In sheep in Yugoslavia, 1476; pathogenicity of *F. nodosus*, 1310; eradication, 3892.

FOREIGN BODY SYNDROME see Digestive system, ruminant digestion.

FORMALDEHYDE As disinfectant, 395; inactivation of viruses, 3582.

FOWL CHOLERA see Pasteurella infection.

FOWL PARALYSIS & AVIAN LEUCOSIS COMPLEX Control in Bavaria, 175; avian myeloblastosis, 492; 3622; erythroleucemia in fowls, 848-50; incidence in Netherlands, 884; electron microscopy of nerves, 1197; avian erythroblastosis, 1198; 1889; pathogenicity of Strain RPL 12, 1552; blood cytology in visceral lymphomatosis, 1553; RTF leucosis virus, 2213; aleukaemic leucosis in ducks, 2264; concurrent with fowl typhoid, 2443; osteopetrosis induced by virus, 2574-5; incidence in Germany, 3034; in Greece, 3370.

FOWL PLAGUE Adsorption of virus to cultured cells, 136; pathogenicity for hamsters, 442; relationship to Newcastle disease virus, 1818; 2564; 3612; multiplication in chick embryos, 2952; structure of virus, 2953.

FOWL POX see Pox diseases.

FOWLS

General Czech book on poultry, 602; anaesthesia, 923; adverse action of too much light, 968; buildings for poultry, 942; 3814; broiler houses, 1960; 2756; carbon dioxide slaughter method, 3106; pentobarbitone sedation before slaughter, 3107; carriage by air, 3813.

Anatomy see Anatomy; Circulatory system, arteries; Lymphoid system; Nervous system, peripheral nerves; Respiratory system.

Arthropod parasites see Lice; Mites.

Bacterial and fungal diseases see Aspergillus infection; Bacterium antratum; Candida infection; Escherichia coli infection; Fusarium; Mycobacterium tuberculosis infection, birds; Pasteurella infection; Pleuropneumonia-like organisms; Salmonella infection, avian; Salmonella pullorum infection; Streptococcus infection; Staphylococcus infection; Vibrio.

Diseases, general Diseases in Alberta, 1199; in Bavaria, 1224; in Greece, 3370; in Germany, 3034; in Netherlands, 884; in U.K., 3724; French book on parasites of birds, 2402; handbook on diagnosis, 2702; poultry service

FOWLS—Diseases, general—[cont'd.]

manual, 3118; book on poultry diseases, 3829; blue comb disease, 3371; cage layer fatigue, 1231; oedema disease of chicks, 2273; cataract, 898; groundnut poisoning, 3384. See also Bones, diseases; Circulatory system, arteries; Digestive system, intestine; Foot; Immunology, anaphylaxis; Nervous system, diseases; Poisoning, plants; Respiratory system, diseases; Skin, diseases; Synovitis, avian.

Helminth parasites see Helminth parasites, fowls.

Physiology see Adrenal gland; Air sacs; Blood; Calcium; Comb; Digestive system; Eggs, hen; Embryos, fowl; Genital system, testicles; Immunology, antibodies; Liver function tests; Minerals; Parathyroid gland; Pituitary gland; Semen; Strontium; Urinary system.

Protozoan diseases see *Borrelia anserina*; *Eimeria* infection; *Leucocytozoon*; *Plasmodium*; *Toxoplasma*; *Trichomonas*.

Virus and rickettsial diseases New virus from respiratory disease, 1140; GAL virus, 1551; 2204; 2205; 2577; 3325; CEO virus, 2576.

See also Bronchitis, avian; Encephalomyelitis, avian; Fowl paralysis; Laryngotracheitis, avian; Newcastle disease; Pox diseases, fowl pox; Psittacosis; Rickettsia infection, Q fever.

FOWL TYPHOID see *Salmonella gallinarum* infection.

FOXES Mortality in wild fox, 1492; 3035; mange, 1523-4; helminths, 3645.

See also *Isospora* infection; *Leptospira* infection; Rabies; *Salmonella* infection.

FRAMYCETIN In avian coccidiosis, 3927.

FRANCE see Foot and Mouth disease; Hepatitis, duck virus; *Leptospira* infection, swine; Milk fever; Mucosal disease; Reports.

FREEMARTINS see Sex.

FREEZING & FREEZE-DRYING Freeze-thaw concentration of fluids, 1654; freeze-drying psittacosis virus, 3267; anthrax vaccine, 3467.

FRENCH EQUATORIAL AFRICA see Pleuropneumonia, bovine.

FRUCTOSE In goat placenta, 3414.

FUNGI

General Culture media, 82; toxicity of *Ceratostomella fimbriata*, 237; handbook of Commonwealth Mycological Institute, 594; helminth larvae killed by *Arthrotrichy*, 1173; in ears of dogs, 668; 1404; *Sabouraudia*, a new journal, 1662; Dictionary of the fungi, 2029; pathogens in soil, 2467; yeasts in rumen, 2883; demonstration in tissues, 3548; in cattle feeds, 3549; spores in air of cowshed, 3902; fungi of India (book), 4215.

Diseases Gastro-enteritis in pigs, 361; Russian book on mycotoxicoses, 363; 3552; mouldy food and respiratory disease in cattle, 1061; maduromycotic nasal granuloma in cattle, 1062; mycotic bronchopneumonia in parrots, 1063; mediastinal blastomycosis in dog, 1064; infections in horses resulting from antibiotic therapy, 1760; mycotic dermatitis in cattle, 2129; mycotic granulomas of skin in horse, 3550.

See also Actinomyces; *Aspergillus*; *Blastomyces*; *Candida*; *Coccidioides*; *Dermatophilus*; *Fusarium*; *Haplosporangium*; *Histoplasma*; *Nocardia*; *Rhodotorula*; Ringworm; *Sporotrichum*; *Stachybotrys*; *Trichosporon*.

FURALADONE Condemned for human use, 1591.

FURAZOLIDONE For *salmonella* in partridges, 641; for quail enteritis, 1003; effect on pullorum agglutinins, 1026; toxicity for turkey, 2324; for swine dysentery, 2805; for salmonellosis in foal, 2836; for coccidiosis, 2141; 2897; 3927; depresses chick growth, 4139.

FUSARIUM Toxins in foodstuffs, 363; 365; toxicosis in fowl, 364.

FUSIFORMIS MELANINIGENICUS see *Bacteroides*.

FUSIFORMIS NECROPHORUS In liver abscesses in cattle, 1916; necrotic hepatitis in lamb, 3532.

FUSIFORMIS NODOSUS Pathogenicity, 1310; isolation technique, 1397.

FUSIFORMIS RAMOSUS In cat, 2109.

GAL VIRUS see Viruses, General.

GALLAMINE For immobilizing wild animals, 1595.

GALL BLADDER see Liver.

GAMMA GLOBULIN Preparation, 974; protective properties of pig globulin, 2119.

See also Blood, globulins.

GASTEROPHILUS see *Oestridae*.

GASTRO-ENTERITIS, PORCINE TRANSMISSIBLE In East Germany, 433; properties of East German virus, 434; in U.S.S.R., 2944; in Poland, 3253.

GEELDIKKOP see Photosensitization.

GESE Hatchability of eggs, 1648; list of parasites, 3278. See also *Amidostomum*; *Aspergillus* infection; Insemination, Artificial; *Salmonella* infection, avian.

GEL DIFFUSION TEST Density of precipitate, 1512; zone displacement, 1513; labelled antigens, 2964; quantitative test, 3271; in bovine tuberculosis, 18; in infectious anaemia, 750; for enteroviruses, 3602; for virus diseases, 3624; limitations, 3999; 4004.

See also Bronchitis, avian; *Brucella* group; Exanthema, porcine vesicular; Foot and mouth disease; Newcastle disease; Rabies, diagnosis; Pox Diseases; Rinderpest; *Stephanurus*; Swine fever.

GENITAL SYSTEM

General Histochemistry of accessory genital organs in boar, 260; genital TB. in cows, 308; coital vesicular exanthema in cows, 1470; secretory activity of seminal vesicles in bull, 2012-3; topography of prostate in dog, 2363; *pseudomonas* in bull, 3491; diseases of bull, 3424-5; 3716.

Cervix Crystallization of mucus in cow, 948; crystallization of mucus in mare, cow and bitch, 2004; double cervix in cow, 3104; cervical mucosa biopsy in mare, 3432.

Corpus luteum The corpus luteum-pituitary relationship, 265-8; factors inhibiting o.l. in cow, 287; action of PMS in ewe, 1299; function during pregnancy, 2372; biochemistry and histology in cow, 3099; in pregnant cow, 3100; retrogression following partial hysterectomy, 3413; action of pituitary extract on cow, 3792; glycosidase in cow and sow, 4179; enucleation in cow, 4200.

Oestrous cycle Oestrus induced by hormones in ewe, 569; 3430; 4193; changes in body temp. of cow, 949; inhibition of oestrus in bitch by acetoxyprogesterone, 957; stages of cycle in cow, 2005; in Swedish cows, 2762; hormone-synchronized oestrus in cow, 2764; suppression by progesterone in sheep, 2765; seasonal changes in ewe, 3795.

Ovary The follicular system in cow, 568; ovarian function in ewe, 570; arrhenoblastoma in hen, 846; detecting ovulation in cow, 950; hormones and ovary function in cow, 955; seasonal changes in ewe, 1292; egg transfer in sheep, 1638; neoplasms in dog, 1885; 3007; direct action of oestrogen in rat, 2016; incidence of disorders in cow, 2018; cysts in cow, 2019; histology in sow, 2353; hepato-ovarian syndrome, 2376; progestins in cow, 2372; steroids in follicular fluid of mare, 2763; effects of starvation in fowl, 3102; control of ovulation, 3121; oestrogens in mare, 3427; passage of artificial ova labelled with radiogold in cow, 3788; ovum transfer in cow, 3789; hypoplasia in Swedish cows, 3808.

Oviduct Egg transport in rabbit, 567; 3422; physiology in ewe, 2006.

Placenta Transmission of antibodies in monkey, 139; anastomosis between sheep fetuses, 574; response to bacterial infection, 1035; in ovine virus abortion, 1126; passage of tetanus antitoxin, 1753; retained placenta in cow, 2010; 3098; glucose uptake in sheep and goat, 2355; structure in cat, 2356; histopathology in brucellosis, 1034; 2446; morphology in cow, 2744; lesions in ovine vibriosis, 2878; morphology in camel, 3088; 4178; fructose formation in goat placenta, 3414; electron microscopy, 3780; proliferations of amnion in cow and other animals, 4150.

Prepuce Separation from penis in ox embryo, 271; inflammation and prolapse in bull, 962; innervation in bull and ram, 2352; transmissible papilloma of preputial diverticulum in pig, 2653.

Testicles Neoplasms in animals, 167; 487; effect of cooling cock's testicles, 261; structure of gubernaculum in pig, 272; heat regulating function of spermatic artery, 554; spermatogenesis suppressed by diamines, 910; interstitial tissue in cryptorchid stallion, boar, dog, cat, 960; bacterial orchitis in stallion, 1058; virus orchitis in bull, 1120; 1800; spermiositis in bull, 1641; streptococcal orchitis in bull, 1677; epididymitis in ram, 1408; 1736-7; 2855; spermatogenesis in bull, 1979; 3087; androgen content in bull, 2012-3; histopathology in bull, 2017; spermatogenesis in pig after X-irradiation, 2298; cryptorchid rat, 2383; degenerate sperms in epididymis, 3097; ageing of bull sperms in epididymis, 3421; passage of spermatozoa in bull testicle studied with radiophosphorus, 3779; action of stilboestrol on bull, 3793; action of testicular antigen, 4002; electron microscopy of bull testicle, 4174; development in bull, 4176; hypoplasia in bull, 3808; 4198; biopsy in bull, 4199.

Uterus Histochemistry of cow endometrium, 571-2; 3675; electron microscopy of cow endometrium, 1980; histopathology in cow, 3426; microflora in cow, 25; 1474; bovine endometritis, 2009; 2019; 2117; composition changes in cow, 2373; hormones and sensitivity to infection, 953; bactericidal activity in rabbit, 1353-6; action of neostigmine and pituitrin in sow, 2007; biopsy instrument, 2008; myometrial function in ewe, 2015; blood flow in goat, 2354; cystic glandular hyperplasia in ewe, 2770; neoplasms in rat, 3009; pyometra in bitch, 294; enzymic breakdown of glyceryl compound in semen, 3412; cyclical changes in pig endometrium, 3423; histo-

GENITAL SYSTEM—Uterus—[cont'd.]

logy in mare, 3427; action of progesterone, 3798; uterine tetanus in mouse, 3896; intra-epithelial granular cells in cow, 4177.

Vagina and vulva *Haemophilus* infection in cow, 39; 1701; prolapse in ewe, 285; bacteria in bovine granular vaginitis, 988; microflora in cow, 1414; prolapse in rabbit cow, 1441; catarrhal vaginitis in cow, 1677; pustular vaginitis caused by bovine rhinotracheitis virus, 2177; antibodies in vaginal mucus, 2591; dilatability in ewe, 3794.

GERBILS see Wild Animals.

GERMANY see Aujeszky's disease; *Brucella* infection, cattle; Encephalomyelitis, porcine; Fowls, diseases general; Gastro-enteritis, porcine; *Mycobacterium tuberculosis* infection; Rabies; Rhinotracheitis, bovine; *Salmonella* infection, general; Sheep, diseases; Stomatitis, bovine; Swine, diseases.

GERM-FREE LIFE Pathogen-free pigs, 965; virus in germ-free rats, 2201; neoplasms in rats and mice, 2267; vitamin A deficiency in rat, 2285; anthrax in rat, 2807; pneumonia in guinea-pig, 3045; irradiated diets for guinea-pig, 4063.

GIARDIA In dog, cat, mouse, 2501; metronidazole therapy in mice, 3940.

GIBBERELLIN Effect of treated plants on rabbit, 1200.

GIRAFFES ...see Circulatory system, general.

GLASSER'S DISEASE Role of PPLO plus *Haemophilus*, 659; 660; prevention and treatment, 1229.

GLANDERS see *Pfeifferella mallei* infection.

GLOBULINS see Blood, globulins; Immunology, antibodies.

GLOSSINA Breeding habits, 2227; research in East Africa, 2483; sampling in Uganda, 2599; control by dieldrin from aircraft, 3284.

GLUCOSE Hypoglycaemia during listeria infection in sheep, 329; action on enzymes in cattle, 1265-6; sources of blood glucose in sheep, 1963; hypoglycaemia in puppy, 2697; in umbilical blood of pig, 2735; utilization in sheep, 1204; 3332; in milk formation, 3403; tolerance in cattle, 3768; metabolic effect of i/v injection in sheep, 4086; intravenous drip for ketosis, 4087.

GLOSSITIS see Digestive system, tongue.

GLYCERYLAMIDE see Eimeria infection, treatment.

GNATHOSTOMA In liver of pig, 479.

GOATS PPLO from septicaemia and arthritis, 683; neoplasms, 837; neck appendages, 1961; diseases in Saudi Arabia, 3031; myotonia, 3679.

See also Ascaris; Bones, diseases; *Brucella* infection, diagnosis; *Dermatophilus*; Eimeria infection; Encephalitis, tick-borne; *Escherichia coli* infection; Fasciola; Genital System, uterus; *Haemonchus*; *Haemophilus*; Immunology, general; Infertility; *Leptospira* infection; Lice; Listeria; Mammary gland; Mange; Mastitis, caprine; Metabolism; *Mycobacterium johnii* infection; Neoplasms; Oesophagostomum; *Pfeifferella whitmori* infection; Pituitary gland, general; Pleuropneumonia; Pox diseases, goat pox; Rabies; Schistosoma.

GOITRE see Thyroid gland.

GONADOTROPHINS see Sex hormones.

GOUT In reptiles, 1247.

GRASSES see Pastures.

GRASS SICKNESS OF HORSES Experimentally produced, 2270.

GRASS TETANY OF COWS see Magnesium.

GREECE see *Brucella* infection; Fowls, diseases general.

GREENLAND see Rabies.

GRISOFULVIN For ringworm, 669; 1069; 1758; 1764; 3056.

GROUNDNUTS Toxicity, 3384; 4118.

GROWTH FACTORS Penicillin and the intestinal clostridia in chick, 176; adrenal steroids and diethylstilboestrol in cockerel, 177; tetracycline for chick, 495; effect of gibberellin-treated plants on rabbit, 1200; chlortetracycline plus nitrophenide in chick, 1777; chlortetracycline and vitamin A, 1904; hygromycin B for broilers, 3317; action of growth hormone on pig, 1282; steroidal saponins for lamb and cattle, 4068.

See also Chlortetracycline; Copper sulphate.

GUAIACOL Glyceryl ether as relaxant, 1262.

GUINEA-PIGS see Anaesthesia; Eimeria infection; Germ-free life; *Haemophilus*; Ketosis; Newborn animals; *Pasteurella pseudotuberculosis* infection; Penicillin; Respiratory system, diseases; Ringworm; *Streptococcus* infection.

HAEMATURIA, BOVINE CHRONIC Russian studies, 1582.

HAEMOBARTONELLA Role of spleen in infected mice, 3555.

HAEMOGLOBINURIA In calves from excessive drinking, 2265.

HAEMOLYTIC DISEASE OF NEW-BORN Foal, 1161; pig, 1162; sheep, 2226.

HAEMONCHUS Haemagglutination test, 165; in lamb, 1853-5; larvae in artificial media, 1858; influence of diet of sheep, 2626; mode of action of phenothiazine, 1176; resistance to phenothiazine, 2623; 4029; action of Ruelene, 2991; treatment with trichlorophen, 2637; efficacy of organic phosphorus compounds, 2995; irradiated vaccine for sheep, 2996; anthelmintic for goat, 3310; antibodies in cattle, 3651; sheep immunized with antelope strain, 4042; Cyanamid 88023 treatment, 4044.

HAEMOPHILIA see Blood, diseases.

HAEMOPHILUS INFECTION In chinchilla, 38; new species from vaginitis in cow, 39; 1701; meningo-encephalitis in cattle, 40; Glaesser's disease in pig, 659; 660; infectious bovine keratoconjunctivitis, 761; *H. bovis* in lab. animals, 1015; bronchi-septicus in lab. animals, 3867; toxins of *H. bovis*, 2829; *Moraxella caprae* from goat, 1410; bronchi-septicus in pig, 2066; catalase in *Haemophilus* species, 2067; bronchi-septicus in guinea-pig, 2435; *Moraxella* in bone marrow of pig, 2068; phages of *H. bronchi-septicus*, 2831; haemophilus-like organism from pneumonia in pig, 3152; infectious bovine keratitis in India, 3866.

HAEMORRHAGE Haemorrhagic disease in deer, 2179; 2951; induced in rodents by Thai virus, 3979.

HAEMORRHAGIC SYNDROME OF FOWLS Role of selenium and torula yeast, 188; 1907; role of vitamin K, 2286; general account, 4099.

HAEMOSPORIDIN Against theileria in cattle, 708; in horse, 1113; for leptospirosis, 1742.

HAIR Arsenic content in cattle, 544; localization of radio-selenium in dog, 899; zinc content in cattle, 1286; growth in zebu and European cattle, 3755; seasonal and regional variations in the coat of cattle in Israel, 3756.

HALOTHANE Action on animals, 3073.

HAMSTERS Rat virus pathogenic, 3608.

See also Mange; Neoplasms.

HAPLOSPORANGIUM Infection in wild animals, 3195; 3540.

HARDERIAN GLAND Inflammation in rat, 2703.

HARES see *Brucella* infection; *Erysipelothrix rhusiopathiae* infection; Neoplasms; *Pneumocystis*; *Protostrongylus*; *Salmonella pullorum* infection; *Theileria* infection.

HEART see Circulatory system.

HEDGEHOGS see Immunology, antibodies; *Leptospira* infection; Ringworm.

HELIOTROPIUM Alkaloids combine with copper, 3385; malformations caused in rat, 3746; poisoning in cattle, 2710.

HELMINTHOSPORIUM Granuloma in cattle, 1062.

HELMINTH PARASITES

General In elephant, 148; book in German on helminths of animals and man, 592; exsheathement of larvae, 1171; larvae killed by *Arthrobotrys* fungi, 1173; *Nippostrongylus* infestation and protein digestion, 1542; larvae in artificial media, 1858; in deer, 2292; in fox, 3645; in British mink, 1880; Russian book on helminths of poultry, 2030; work of the Helminthological Laboratory, Moscow, 2255; mixed infections in rat, 2617; trichostrongyles in the Netherlands, 2619; trichostrongylids of animals and man, 2788; animals in India, 4026.

See also Immunology, immunity to helminths.

Cats

Trematodes, 815.

See also *Bronchostrongylus*; *Ollulanus*.

Cattle Acquisition from sewage-irrigated pastures, 161; change in egg counts at calving, 1537; role of dung in transmission of parasites in dry climate, 1851; helminthological technique, 1852; in Nigeria zebu, 2983; 3652; in U.S.A., 4039; incidence in U.S.S.R., 4052.

See also Anthelmintics; Ascaris; Cooperia; *Dicrocoelium*; *Echinococcus*; Fasciola; Fascioloides; *Haemonchus*; Lungworms; *Oesophagostomum*; *Onchocerca*; *Schistosoma*; *Stephanofilaria*; *Strongyloides*; *Taenia*; *Thelazia*.

Dogs see *Ancylostoma*; Anthelmintics; *Capillaria*; *Diocetophyme*; *Dipetalonema*; *Dirofilaria*; *Echinococcus*; *Filaroides*; *Heterobilharzia*; *Metorchis*; *Spirocerca*; *Toxocara*; *Trichinella*; *Uncinaria*.

Fowls Survival of nematodes in faeces and soil, 1772; helminths in Czechoslovakia, 4054.

See also Anthelmintics; Ascaridia; *Capillaria*; *Mesocostoides*; *Prosthogonimus*; *Streptocara*; *Syngamus*; *Toxocara*.

Horses Helminths in donkeys, 1879.

See also Anthelmintics; *Echinococcus*; *Fasciola*; *Onchocerca*; *Strongylus*; *Thelazia*; *Trichostrongylus*.

Sheep In South Australia, 586; haemagglutination test for nematodes, 165; changes in serum proteins, 823; differentiation of larvae, 825; spring rise in egg counts, 1171; anaemia from trichostrongyles, 1223; Australian report, 1310; management and parasitism in lambs, 1853-5; 2999; effect on the blood, 2254; control in Germany, 2256; new approach to treatment, 2992; egg counts in Southern Rhodesia, 2994; role of nutrition, 3307; influence on weight gains, 3654; liver function

HELMINTH PARASITES—Sheep—[cont'd.]

during helminth infestations, 4019; in India, 4026; incidence in U.S.S.R., 4052.

See also Anthelmintics; Ascaris; Cystocaulus; Dicrocoelium; Echinococcus; Fasciola; Haemonchus; Lungworms; Moniezia; Muellerius; Nematodirus; Ogmocotyle; Onchocerca; Strongyloides; Taenia; Teladorsagia; Thysianezia; Toxocara; Trichostrongylus.

Swine see Anthelmintics; Ascaris; Echinococcus; Echinococcus; Gnathostoma; Hyostrogylus; Lungworms; Metastrongylus; Stephanurus; Trichinella.

HEPATITIS see Liver, diseases.

HEPATITIS, AVIAN INFECTIONOUS Virus in turkeys, 2210; vibronic in Canada, 2464.

HEPATITIS, CANINE VIRUS Properties of Russian virus, 437-8; relationship to human hepatitis, 439; purification of tissue cultured virus, 775; related to human adenovirus, 1132; transmitted during rabies inoculation, 1133; in Japan, 1134; vaccine against hepatitis and distemper, 1488; electron microscopy of infected kidney-cell cultures, 1489; development of antibodies, 1490; serological studies, 1814; antibodies in bitches, 1815; immunization, 2192; vaccine against distemper, hepatitis and leptospira, 2193; complication by liver flukes in sledge dogs, 2559; haemagglutination by virus, 2560; cytopathic action of virus, 2947; in fox and raccoon, 2949; inactivated vaccine, 2948; complicated by distemper, 3259; haemagglutination-inhibition test, 3605; unrelated to chronic nephritis, 3606; in unweaned puppy, 3971; virus compared with human adenovirus, 3973.

HEPATITIS, DUCK VIRUS Tissue culture of virus, 449; 3623; in France, 787.

HEPATITIS, MURINE VIRUS Properties of virus, 2200.

HEPTACHLOR see Parascitides.

HERBICIDES Plants treated with 2,4-D or silvex fed to sheep, 3065.

HEREDITY

General Anomalies of teeth in horse, 578; cataract in dog, 1929; polydipsia in mice, 1930; genetics and resistance to disease in lab. animals, 3712; genetic perspectives in disease resistance, 3805-6.

Cattle Spermiostasis in bull, 1641; coat characters, 1645; inheritance of multiple lipomas, 1883; congenital porphyria, 2683; double cervix, 3104; spastic paresis, 3439; types of transferrin, 3804; gonadal hypoplasia, 3808; 4198; defect in ventricular septum, 3809.

Poultry Inherited resistance to Rous sarcoma, 1828; foot deformity in fowl, 2021; head tremor in turkey, 2022; resistance to pullorum disease, 3164; paroxysm in fowl, 4202.

Sheep Silky mutation in Merino sheep, 576; potassium and haemoglobin types, 2729-30.

Swine Crooked tail, 577; dermatosis vegetans, 2020.

HETERAKIS Hygromycin treatment, 1873; prophylaxis with nitroimidazole, 2893.

HETEROBILHARZIA In dog, raccoon and nutria, 4020.

HETOL Bis(trichloromethyl) benzene, 809-810; 2234-5.

HEXACHLOROBENZENE see Poisoning, organic poisons.

HEXACHLOROETHANE see Anthelmintics.

HEXACHLOROPHENE see Anthelmintics.

HEXAMITA MELEAGRIDIS In turkey, 2140.

HEXOESTROL See Sex hormones, oestrogens.

HIDES & SKINS Lesions in zebra, donkey and eland, 1067.

HISTOCHEMISTRY Accessory genital organs of boar, 260; cow endometrium, 571-2; nuclear protein in hepatitis, 754; enzymes, 2335; PAS in blood cells, 2340; echinococcus, 2615; urinary calculi, 3330; glycogen in renal epithelium, 4173; adrenal glands in animals, 4184.

HISTOMONAS MELEAGRIDIS Tissue culture, 698; survival in nematode eggs and poultry faeces, 1772; control by adding drug to feed, 2894; isolation from gut contents, 3558; pathogenesis, 3935.

HISTOPLASMA CAPSULATUM INFECTION Experimental in horse, ox, sheep, pig, 668; in dog, 667; 3641; in a baboon, 1068; in soil, 2467; 2470.

HISTOPLASMA FARCINOSUM INFECTION In the Sudan, 1065.

HISTORY Of veterinary medicine in America, 2408; of the horse, 2795.

HOCK see Joints.

HOMIDIUM Resistant trypanosomes, 695; action on trypanosomes, 1078.

HORSES, DONKEYS & MULES

General Doping, 2755; German book on history of horse, 2795.

Arthropod parasites see Blowflies; Oestridae, Gastrophilus; Ticks.

Bacterial and fungal diseases see Aspergillus; Bacterium viscosum equi; Brucella infection; Clostridium tetani infection; Corynebacterium equi; Histoplasma farcinosum infection; Keratinomyces; Leptospira infection; Mastitis, equine; Mycobacterium tuberculosis infection; Nocardia; Pasteurella; Pfeifferella mallei; Ringworm; Salmonella infection; Staphylococci; Streptococcus infection; Streptococcus equi infection.

Diseases, general Diseases in Venezuela, 1457; foetal deaths, 2011; mal seco in Argentina, 2684; pathology of serum horses, 2685; disease like milk fever, 3360.

See also Blood, diseases; Bones; Circulatory system; Digestive system, intestine; Eyes; Fistulous withers; Grass sickness; Haemolytic disease; Leucosis; Lymphatic system; Neoplasms; Poisoning, plants; Respiratory system; Skin; Spleen; Suliyuk disease; Teeth.

Physiology Haematology of racehorses, 1969; strontium metabolism, 2731.

See also Blood; Circulatory system, heart; Genital system; Sex hormones, oestrogens.

Protozoan diseases see Toxoplasma; Trypanosoma equiperdum.

Virus and rickettsial diseases see Abortion, equine; Anaemia, equine; Borna disease; Encephalomyelitis, equine; Exanthema, coital vesicular; Horse sickness; Influenza; Rhinopneumonitis; Rickettsia infection, Q fever.

HORSE SICKNESS, AFRICAN General account, 752; vaccine, 1458; 2529; 2779; vaccination in Tanganyika, 1659; report of FAO/OIE meeting, 1797; 2528; properties of virus, 2530; the 1959-60 epidemic, 3272; 3239; FAO report, 3586.

HOUSING OF ANIMALS see Farm buildings.

HYALURONIDASE For urolithiasis, 2269; no enhancement of anthrax immune serum, 611; quickens absorption of carbon tetrachloride, 2331; 3641; veterinary uses, 3752; in bull semen, 3800.

HYDATID DISEASE see Echinococcus.

HYDROCORTISONE see Steroids.

HYGIENE Carcass-disposal plant, 2367; hatchery sanitation, 2471; 2757.

See also Disinfectants; Farm buildings; Food hygiene.

HYGROMYCIN see Anthelmintics.

HYMENOLEPIS In rat, 2617; autoinfection in mouse, 4024.

HYOSTROGYLUS Cultivation, 824; gastritis in pig, 1176.

HYPERGLYCAEMIA see Glucose.

HYPODERMA see Oestridae.

HYPOMAGNESAEMIA see Magnesium.

HYPOTHALAMUS see Nervous system, brain.

IDENTIFICATION OF ANIMALS Papilloma after ear tattooing in cattle, 3593.

ILL THRIFT see Cattle, youngstock.

IMMUNOLOGY

General Initiation of the immune response, 138; pre-cipitin production in chicken, 457; immunological tolerance, 458; 2220-2; 3277; tissue tolerance in sheep, 1150; mechanisms of cellular immunity, 1515; 3534; passive transfer of delayed sensitivity, 1832; runt disease in mice, 2223; recognition of self, 2970; the autonomic nervous system and immunity, 3275; non-specific immunity, 3466; 3335; graft-against-host reaction in fowl, 3635; genetic perspectives in disease resistance, 3805-6; sex and susceptibility to bacteria, 3900; effect of vaccine on leucocyte count, 4003.

Allergy From milk in cow, 141; 3274; pseudomembranous coryza in cattle, 1226; ragweed allergy in dog, 2218.

Anaphylaxis Delayed hypersensitivity in guinea pig embryo, 142; shock in fowl, 2588; from milk substitute in calf, 2589.

Antibodies Transmission to piglet, 127; formation in piglet, 3631; transmission to monkey foetus, 139; inhibition by hyperimmunization, 140; linkage to polystyrene, 794; antibody response in fowl, 682; 796; 1831; tissue-sensitizing cell antibodies in pig, 1018; antibody formation stimulated by coli endotoxin, 1708; selection by gut of rat, 1147; immunological unresponsiveness in mouse, 1149; theory of antibody production, 1511; 3270; labelled gamma globulin fed to rat, 1729; adjuvants and antibody formation, 1834; formation in mammary gland, 2219; 2966; 3216; blocking antibodies, 2447; direct anti-globulin-consumption test, 2590; in vaginal mucus, 2591; absorption from calf intestine, 2720; tissue antibodies and congenital malformations, 2969; incomplete antibodies to avian red cell antigen, 3272; transfer of spleen cells in mouse, 3273; production in cultures lymphoid tissues, 3276; formation in omentum, 3632; formation in new-born guinea-pig, 3634; transfer to young hedgehog, 3874; antibody formation and inoculation route, 4000.

Antigens Adsorption on polystyrene particles, 459; iso-antigens of pancreas, 1514; immunochemical titration, 2585; adsorption of viral antigens in ion-exchange columns, 2963; testicular antigen, 4002.

Complement C.f. test for virus infections, 112; 404; 2962; 3236; fixation inhibited by heated serum, 2130; conglutinating complement adsorption test, 2155; c.f. test on pig serum, 2542; 2860; proportion of antigen, 2965; fixation with fowl serum, 3229.

Immunity to helminths Haemagglutination test for sheep nematodes, 155; X-irradiated trichostrongyle

IMMUNOLOGY—Immunity to helminths—[cont'd.]

larvae in lamb, 822; 1540; lack of tolerance to trichinella, 1170; Cooperia and Oesophagostomum in calf, 1177; Dictyocaulus in guinea-pig, 1184; recent advances, 1544; immunization of farm animals, 1878; resistance of male and female mice, 3000; acquired immunity, 3305; some aspects of the mechanism, 3306; antibodies to Haemonchus in cattle, 3651; autoinfection by Hymenolepis in mice, 4024; irradiated hookworm larvae in dog, 4037; sheep immunized with Haemonchus from antelope, 4042.

Interference phenomenon Prospects for interferon, 454; antiviral action of interferon, 791; 2172; 3626; cortisone inhibits interferon, 3233.

Vaccines High temperature-short time method for inactivating virus, 783; fifth meeting on biological standardization, 1148; aerosols of dried vaccines, 1835; role of inflammation caused by live vaccines, 2097; combined vaccines, 1836; 2110; 2556; methods of testing, 2968.

INDIA see Fungi; Haemophilus infection; Helminth parasites, general and sheep; Kyasanur forest disease; Listeria infection; Mites.

INDONESIA see Babesia infection; Newcastle disease; Rabies; Salmonella infection, general.

INFERTILITY

General In goat, 1703; in rabbit fed clover, 1891; pro-gestosterone therapy for sow, 3796.

Cattle In Australia, 292; 1642; in New Zealand, 3435; in Sweden, 3434; role of brucella and vibrio in England, 657; hormone therapy, 961; 1640; 3796; virus orchitis and endometritis, 1120; caused by oestrogen in lucerne, 1295-7; spermiostrasis in bull, 1641; nutritional, 572; 1894; survey of causes, 2018; without symptoms, 2381; Belgian report, 2769; incidence in Friesians, 2772; anoestrus in buffalo, 3428; prenatal mortality, 3437; BVA handbook, 3790; role of minerals in pasture, 3689; in zebu in Papua, 3801; C. pyogenes in bull, 3481; diseases of bull, 3716.

Horses Brucella in stallion, 642; discussion, 2380; four hundred cases, 2771.

INFLAMMATION Reaction of new-born calves, 252.

INFLUENZA

General Viruses from horse, pig, ox, fowl, duck, 1450; 2166; transmission to foetus, 1795; adjuvant vaccine, 2169; inhibitors in serum, 3584; influenza and resistance to bacteria in mice, 3951.

Bovine see Para-influenza.

Equine Virulence of the virus, 110; neutropism of virus in lab. animals, 753; accompanied by abortion, 1798; general account, 2168; rhinopneumonitis, 2526.

Porcine Virus in brain of piglets, 126; virus in pericardium, 1811; transmission by lungworms, 2189; 3257; vaccine, 2190; changes in blood enzymes, 2942; climate and piglet influenza, 1810; antibodies, 127; 2167; in Slovakia, 3256.

INSEMINATION, ARTIFICIAL

General Book on A.I. in animals, 297; in dog, 298; in Netherlands, 944; effect of semen pH in rabbit, 2000; duck and goose, 2001.

Cattle Report of U.K. Milk Marketing Board, 584; sex drive in bull, 1629; transmission of leptospires, 2098; management of stock and A.I. results, 2772; A.I. and infertility, 3434.

Sheep In Australia, 1627; 2758; 4191.

Swine In U.K., 951; in Japan, 1628; in Belgium, 3438; in Netherlands, 3448; 3823; semen dilutions compared, 4190.

INSULIN Metabolic effects, 876-7; action on enzymes in cattle, 1265-6; stress in cattle, 1986; sensitivity of dwarf cattle, 3807.

INTERFERON see Immunology, interference.

INTERVERTEBRAL DISCS Treatment for prolapse in dogs, 223-4; disc protrusion in cat, 225; degeneration in dog, 1928.

IODINE Skin disinfection, 924; Actiniodin for actinomycosis, 1071; deficiency in animals, 1212; injected into grazing sheep, 1571; supplement for cat, 2271; 2272; protein-bound iodine in cow, 4180; Radio-iodine for diagnosis of thyroid disorders, 195; radio-iodine in cattle, 556-7; 1935; 3051; radio-iodine in pig, 558; 3736; radio-iodine tumour therapy, 1194; blood changes in sheep fed radio-iodine, 1585; uptake of radio-iodine by mammary tissue, 1603; radio-iodine transfer to cows' milk, 1604; toxicity of radio-iodine in cow, 1938; antigens labelled with radio-iodine, 2964; radio-iodine in dog, 3727; advantages of dissolving radio-iodine in polyvinyl alcohol, 4105; labelled plasma albumin in sheep, 4168.

ION-EXCHANGE Adsorption of viral antigens, 2963.

IRELAND, REPUBLIC OF see Reports.

IRON Iron dextran in pig, 1568; 1900; 3345; iron and haemoglobin in fowl, 1258; turnover in fowl, 1889; haemoglobin synthesis in piglet, 1897; iron chelate for piglet, 1898; requirements of piglet, 1899; oral iron for piglet anaemia, 1900; advantages of ferrous carbonate, 1952;

injections for anaemia in dog, 2623; in sows' milk, 2667; poisoning in piglet, 2706; deficiency in chick, 3017; amino acid compound for therapy, 3067; content in rat blood reduced by endotoxin, 3535; pigment in stomachs of cattle, 3773; lupinosis and Fe storage in sheep, 4122; iron-dextran in new-born lamb and calf, 4133; complex of iron, sorbitol and citric acid for therapy, 4134.

ISOAGGLUTININS see Blood, general.

ISONIAZID see Anthelmintics, swine; Mycobacterium tuberculosis infection.

ISOSPORA INFECTION In dog and cat, 701; in cattle, 1081; in fox, 3206.

ISOTOPES, RADIOACTIVE see Radiations.

ISRAEL see Hair; Turkey; Neoplasms.

ITALY see Catarrh, bovine malignant; Echinococcus; Salmonella infection, avian; Wild Animals.

ITURINE For ringworm in horses, 2884.

JAMAICA see Reports.

JAPAN Growth of vet. science, 277.

See also Escherichia coli infection; Fasciola; Genital System, diseases; Hepatitis, canine; Insemination, artificial; Leptosira infection, cattle; Leucocytozoon; Virus B.

JAUNDICE see Liver, diseases.

JOHNE'S DISEASE see Mycobacterium johnei infection.

JOINTS Osteoarthritis in cattle, 220; 1225; arthrosis of hock in pigs, 221; 3368; Glaesser's disease in pig, 659; 660; PPLO arthritis in goat, 683; lesions in vitamin C-deficient g.pig, 873; corticosteroid therapy in horse and ox, 921; arthritis in pig, 1246; 1342; 2061; gout in reptiles, 1247; arthritis after pleuropneumonia vaccine in calf, 2473-4; spondyloarthritis in dog, 2696; hip dysplasia in dog, 4197.

KALE see Poisoning, plants; Sex hormones, oestrogens.

KANAMYCIN Against PPLO in cell cultures, 680; antibodies in rabbit, 918; for avian sprochaetosis, 1746.

KANGAROOS Tetanus, 1389; the kangaroo tick, 1522; method of ascertaining diet, 2778; DDT poisoning, 4130; Dipetalonema in meat, 1188; salmonella in meat, 3499.

KENYA see Echinococcus; Pleuropneumonia, bovine; Reports; Swine fever, African.

KERATINOMYCES Skin disease in horse, 2885.

KERATITIS see Eyes.

KERATOCONJUNCTIVITIS, BOVINE INFECTIOUS Role of Haemophilus bovis, 761; 1015; 2829; conjunctival form of rhinotracheitis, 1467.

KERATOCONJUNCTIVITIS, CAPRINE INFECTIOUS Aetiology, 1410.

KERATOCONJUNCTIVITIS, OVINE INFECTIOUS Ethidium bromide therapy, 2830.

KETONE BODIES In blood of foetus or calf, 199; mode of formation in sheep, 201; in milk and blood of cow, 2736.

KETOSIS Biochemical aspects, 198; 507; 3030; as cause of immaturity in calf, 199; urine composition of cow, 200; fatty-acid metabolism in perfused liver, 505; influence of weather, 506; bicarbonate in blood, 929; Russian studies, 1219; acetylmethionine treatment, 1220; fatty acid metabolism in ewe, 1573; treatment with fumarate and cysteamine, 1910; changes in oxidation-reduction, 2274; lesions in pituitary and adrenal glands, 2289; experimental in guinea-pig, 2678; in puppy, 2697; metabolic aspects in ruminants, 3357; nutrition and incidence in cow, 3358; ascorbic acid in blood, 3710; glucose by intravenous drip, 4087; in sow, 4088.

KIDNEYS

General Tests for function in cattle, 906; test for function in dog, 228; tubular secretion of uric acid in dog, 259; 1978; the kidney during pregnancy in cow, 3415; function in sheep given saline, 3700; tests for function in sheep, 3731; glycogen in renal epithelium in animals, 4173.

Diseases Experimental pyelonephritis, 1020; nephritis in buffalo, 1248; neoplasms in dog, 1885; uraemic pneumonia in dog, 1927; polydipsia in mouse, 1930; eosinophilic interstitial nephritis in pig, 2309; Corynebacterium suis in pig, 2427; experimental calcinosis in rat, 3022; chronic nephritis in dog, 3606; haemorrhagic hepatonephritis in dog, 3722; fluorocitrate poisoning in rat, 3737.

KININS In plasma, 552.

KLEBSIELLA In bovine mastitis, 41; pneumonia in dog, 636; Australian strains, 1358.

KURU see Scrapie.

KYASANUR FOREST DISEASE General account, 779; lesions in monkey, 780; tick transmission, 1451.

LABORATORY ANIMALS Book on diseases of lab. primates, 296; design of buildings, 565; German book on rats and mice, 596; a small-animal unit, 943; bibliography, 1650; equipment, 2392; genetics and resistance to disease,

LABORATORY ANIMALS—[cont'd.]

3712; carriage by air, 3813; symposium on provision of animals, 4062; the Japanese quail, 4149; provision of animals for research, 4219.

LACRIMATION In frightened cattle, 3085.

LACTATION Nervous control in goat, 930; effect of corticotrophin injection on cow, 1283; by perfused udder, 1966; initiated in rat by oestradiol and chlorpromazine, 1967; in bitch, 3402; role of acetate and glucose in milk secretion, 3403; role of anterior pituitary, 3760; in goat after hypophysectomy, 4158.

LACTOGLOBULINS In urine of calf, 1985; types in sheep, 2730.

LACTOSE see Sugars.

LARYNGOTRACHEITIS, AVIAN INFECTIOUS Revaccination, 788; haemorrhagic conjunctivitis, 1504; studies on virus, 1505; tissue culture of virus, 2572; rapid histological diagnosis, 2573.

LEAD Chelating agents tried on calf, 1937.

LEECHES *Proteolepsia* in respiratory passages of ducks, 4056.

LEPROSY, BOVINE see *Mycobacterium leprae* Infection.

LEPTOSPIRA GROUP Survival in water, 76; 2876; direct blood cultivation, 1380; classification of hyos strains, 653; new strain of mini, 1046; antigens of pomona, 2100; pomona haemolysin, 2867; isolation on agar plates, 2873; haemolysin, 2875; sensitivity to antibiotics, 3184; typing by decomposition of egg yolk, 3888.

LEPTOSPIRA INFECTION

General In Bulgaria, 2870; in Czechoslovakia, 2869; 3525; in Malaya, 2868; in deer, 3524; in goat, 3181; in goat and camel in Somalia, 1739; in rat in Canada, 2871; in wild aquatic birds, 77; in wildlife in Georgia, 1046; australis in hedgehog, 2869; canicola in skunk, 2456; pomona in fox, 1381; pomona in woodchuck, 1045; quantitative aspects of infection in mice, 74; experimental infection of frog, 2103; proceedings of International Symposium in Warsaw, 2452; recent developments, 2454; cortisone and pomona in guinea-pig, 3526; effect on blood coagulation, 3527; pomona in chinchilla, 3887.

Cat In China, 1386; in U.S.S.R., 2103.

Cattle In Brazil, 349; hebdomadis in Canada, 3177; in China, 1386; australis infection in Japan, 2455; pomona absent from Netherlands, 3178; icterohaemorrhagiae in New Zealand, 649; 2394; in Panama, 1042; in Somalia, 1739; pomona in Switzerland, 1740; in Turkey, 1384-5; pomona in U.S.A., 2864; in U.S.S.R., 2103; serum antibodies in immunized calf, 1043; pomona isolated by blood culture, 1380; haemosporidin therapy, 1742; genital transmission, 2098; icterohaemorrhagiae transmitted to man, 2101; pathogenesis of abortion, 2453; subclinical infection, 2865; pomona antibodies in milk, 3175; pomona vaccines, 3886.

Diagnosis Isolation from urine, 75; fluorescent antibody method, 2457; agglutination-lysis test, 2872; laboratory methods, 3176.

Dog Incidence of carriers, 71; allergic test, 1745; vaccine against distemper, hepatitis and leptospira, 2193.

Horse Periodic ophthalmia, 70; in Yugoslavia, 3179.

Immunology Toxicity of vaccines, 73; review of vaccines, 1047; icterohaemorrhagiae vaccine, 2102; comparison of vaccines in rabbit and horse, 350; nervous system and immunity, 1387; pomona vaccine, 1741; 2874; combined vaccine against leptospira and tetanus, 2110; combined canicola and icterohaemorrhagiae vaccine, 3183; gamma globulin from hyperimmune ox, 1044.

Man From pig in Scotland, 1048; pomona and mitis in France, 1744; from cattle, 2101.

Sheep In Turkey, 1384-5; pomona infection, 1386; 2866.

Swine Experimental infection of piglet, 72; in France, 650; 1743; in U.S.S.R., 651; 652; 1383; hyos in Brazil, 653; canicola in Scotland, 1048; pomona and hyos in Portugal, 1382; bataviae infection, 1386; tarassovi infection, 1383; epidemiology of abortion, 2099; 3180; pomona infection, 650; 2864; 3889.

LEUCOCYTOZOON In fowls in Japan, 2502.

LEUCOSIS

General In foal, 490; plasma-cell leukaemia in mink, 1550; eosinophilic in pig, 3324; in sheep, 3673. See also Fowl paralysis and avian leucosis.

Cattle Bovine leucosis virus, 172; 3504; lymphadenosis in calf, 170; in Denmark, 491; in Danish cattle imported into Yugoslavia, 1196; radio-activity or organs and tissues, 1549; ultracentrifuge examination of serum, 1887; leucocytogen in plasma, 2657; fluorescent antibody test, 3011.

Dogs Reticular haemoblastoma, 171; treatment, 1888; haematology and treatment, 3674.

LICE And brucella, 343; treatment of cattle, buffalo and goat, 4601; ecology of lice on sheep, 1833; lethal action of silica aerogel, 2592; control by Sevin, 2971; DDT for lice on fowl, 3280; in lab. mouse, 4014.

LIGHT Adverse action of too much light on hen, 966; and sexual activity in ewe, 2767; effect of continuous light on fowl, 3778; effect on thyroid function in sheep, 4181.

LINOGNATHUS Development on sheep, 1838.

LIONS see Zoo animals.

LISTERIA MONOCYTOGENES Survival in soil, faeces, straw, 627; 1345; antigenic structure, 628; action of neomycin, 651; metabolism, 629; haemorrhagic toxin, 1696; bacteriophages, 3488.

LISTERIA MONOCYTOGENES INFECTION In a veterinary surgeon, 33; influence of hypoglycaemia on infection in sheep, 329; growth-inhibition test on serum, 330; in slaughtered cattle, 626; abortion in Dutch cattle, 658; entry through facial nerves in sheep, 1008; in dog, 1344; in sheep from silage, 1346; in Moscow area, 1347; mode of resistance to infection, 2063; in Indian goat, 2430; brain lesions in guinea-pig, 2822; in knackered animals, 3145; in sable, 3146; mortality-enhancing factor, 3147; intradermal test, 3865.

LIVER

General Lipoid pigment in sheep, 216; 2306; inactivation of oestrogen in cow, 954; vitamin A in cow, 1216; laparotomy for liver samples from lamb, 1655; enzymes in cow liver, 1984; aspiration biopsy in cattle, 2305; chromaffin cells in cattle and sheep, 2350; wax plate reconstruction of liver, 3769; collection of samples from pig and sheep, 3818; blood supply in turkey, 3935.

Bile duct Anatomy in dog, rat and rabbit, 3759; carcinoma in horse, 3670.

Diseases Liver biopsy in cattle, 218; miliary necrosis in calf, 358; Gnathostoma in liver of pig, 479; Nocardia hepatitis in horse, 674; nodules in rats given Aramite, 840; effect on reproduction in cow, 956; dietetic hepatitis in pig, 1203; action of seneciphylline on fowl, 1255; repeated small doses of carbon tetrachloride in mouse, 1257; bacterial jaundice in sheep, 1756; ascariid hepatitis in pig, 1870; neoplasms in dog, 1885; abscesses in cattle, 1916; lesions in chemical poisoning, 1945; plasma esterases in pig, 1946; hepatotoxin of *Myoporium laetum*, 1948; lesions in equine infectious anaemia, 2175; virus hepatitis in Zoo birds, 2260; hepatitis in turkey, 2307; hepato-ovarian syndrome, 2376; mycotic cholangitis in pig, 2465; flukes and virus hepatitis in sledge dog, 2559; metabolic disorders in cow, 2679; in serum horse, 2685; focal necrosis in mink, 3044; lesions in ovine brucellosis, 3172; necrosis in pig, 3334; hepatoma in duck, 3669; fatty liver induced by orotic acid, 3683; haemorrhagic hepato-nephritis in dog, 3722; influence on test for lactic acid in cow's milk, 3730; mode of action of carbon tetrachloride, 3740; 3742; 4109; toxic dystrophy in pig, 4095; action of pyrrolizidine alkaloids, 4116; hepatotoxic alkaloid poisoning in livestock, 4127.

Gall bladder Lesions in swine fever, 3599.

LIVER FUNCTION TESTS In cattle, 1580; in sheep, 3731; in dog, 3797; bromsulphalein test in cattle, 218; 904; 906; BSP test in horse, 904; excretion of BSP in sheep, 905; BSP test in fowl, 1255; 3083; glycine test for cow, 1581; hippuric acid test, 2351; Zimmer's two-dye test on pig, 3057; enzyme tests in pig foetus, 3407; bilirubin in sheep, 4019; transaminase and cholinesterase in ox, horse, dog, 4108.

LOUPING-ILL Comparison with milk-borne fever virus, 1509; comparison of virulent and attenuated strain, 3246; in man, 3965.

LUCERNE Eruption in cattle, 853; oestrogens, 1295; 1296; fermentation in rumen, 2268; saponin, 2659; bloat in cattle, 3328.

LUCILIA see Blowflies.

LUMPY SKIN DISEASE Tissue culture of virus, 113; in Kenya, 1311; Allerton strain of virus, 1471.

LUNGWORMS

Cattle Incidence and treatment in Denmark, 472; in Poland, 1543; vaccines for cattle, 473; 3657; irradiated vaccine, 826; 1865; 2249; 2640; 3658; 4047; c.f. antibodies in viviparus infection, 827-8; experimental transmission, 829; symposium on husk, 1183; pasture rotation, 1864; cyanacethydrazide treatment, 1185; 2642-3; 3003; 3659; diethylcyanamazine treatment, 2642.

Sheep Cyanacethydrazide treatment, 158; para-bromophenyl isothiocyanate therapy, 1866; phenothiazine treatment, 2248; larval count in faeces, 3311; three new species in U.K., 4048; irradiated vaccine, 4049.

Other animals Metastrongylus in pigs, 474; 2644; 3312; transmission of swine influenza virus, 2189; 3257; cyanacethydrazide for pigs, 1867; 3003; Bronchostrongylus in cat, 1868; Filarioides milksi in dog, 480; immunization of lab. animals against D. viviparus, 2247; Protostrongylus in hare, 3314.

LUPINS see Poisoning, plants.

LUTEINIZING HORMONE see Pituitary gland, anterior hormones.

LYMPHATIC SYSTEM

General Migration of PPLO along lymphatics, 678;

LYMPHATIC SYSTEM—General—[cont'd.]

role in tick-borne encephalitis, 742; ectopic lymphoid foci in fowl, 927; flow of lymph from udder, 1968; Peyer's patches in rabbit ileum, 2364.

Diseases Lymphatic leucosis in a foal, 490; pasteurellosis in cattle, 1009; lymphosarcoma in cattle, 2263; subserous hyperplasia of lymphatic tissue in pig, 2308.

Lymph nodes Tuberculous lesions in pig, 21; 3139; swollen nodes in liver and lungs of horse, 214; salmonella in pig and cattle, 334; salmonella in mesenteric nodes, 1711; lesions in bovine brucellosis, 1721.

LYMPHOMATOSIS see Fowl Paralysis.

M & B 5062A see Diampron.

MADAGASCAR see Encephalomyelitis, porcine.

MAGNESIUM Grass tetany in cow, 2680; 3346; 3689; 4065; hypomagnesaemia in buffalo, 2670; calcium in muscle of Mg-deficient cow and sheep, 3340; calcined magnesite for cattle, 1209; 2275; Mg in blood of bullock, 1555; blood electrolytes in deficient cow and calf, 1566; 4065; metabolism in cow, 868; 1208; metabolism in calf, 2733; 3014; 3694; 4079; deficiency in sheep, 3689; Mg bullets for deficient sheep, 2276; metabolism in sheep, 184; 1987; 2671; 3690; 4166-7; radiomagnesium metabolism in lamb, 4078; serum content lowered by vitamin D3 in sheep, 1217; in heart muscle of pig, 891; 1293; deficiency in dog, 3692; deficiency and metabolism in fowl, 2277-8; requirement of chick, 501; metabolism in man and animals, 2668; 2669; deficiency in man, 179; 219; 3693; Mg acetylmethionate in veterinary therapeutics, 1260; intestinal absorption in rat, 3347; radiomagnesium in bone of rat, 2745; deficiency in rat, 1567; metabolism of Mg-28 in rabbit, 874; placental transfer of Mg-28 in rabbits, 875; Mg in plants, 3021; 3691; determination by atomic absorption spectrophotometry, 3442.

MALATHION see Anthelmintics; Parasticides.

MALAYA see Brugia; Leptosira infection.

MAL SECO Disease of horse, 2684.

MALUCIDIN Action on pregnant bitch, ewe and cat, 1633.

MAMMARY GLAND Teat shape and mastitis, 982; flora of bovine udder, 1320; 1324; spreading factor in cows' udder, 1601; transplantation in goat, 1602; uptake of radio-iodine, 1603; excretion of radio-iodine, 1604; supra-mammary lymph nodes in brucellosis, 1721; carcinoma in dog, 1884; perfusion of udder, 1966; antibody formation, 2219; 3216; antibody formation in cow, 2966; flow of blood and lymph in goat, 1968; culture of bovine cells, 2385; cystic fibrosis in cow, 2689; book on the mammary gland, 2791; effect of disease or injury on milk-yield experiments, 3113; transfer of antibiotics from milk to blood, 4136.

See also Mastitis.

MAN, DISEASES OF ANIMALS TRANSMISSIBLE TO & FROM Disease like foot and mouth disease, 1508; cat-scratch disease, 2580; skin disease in veterinarians, 3377; infectious hepatitis transmitted by chimpanzee, 3993.

See also Ascaris; Bacillus anthracis infection; Brucella infection; Dipylidium; Erysipelothrix monocytogenes infection; Foot and mouth disease; Leptosira infection; Louping ill; Plasmodium infection; Ringworm; Toxoplasma infection.

MANCHESTER WASTING DISEASE Of cattle in Argentina, 3329.

MANGANESE Deficiency in cattle in Zealand, 499; placental transfer in pig, 3018; malformations in deficient rat, 3351; requirements of budgerigar, 3348.

MANGE Sarcoptic in dingo, 3295; sarcoptic in fox, 1523-4; sarcoptic in goat, 3294; sarcoptic in pig, 144; notoedric in cat, 463; life history of Demodex folliculorum, 2980; demodectic in eland, 1067; ronnel for demodectic mange in dog, 1525; trichlorophen for demodectic in dog, 2604; Demodex in vitamin-deficient hamsters, 2605; demodectic in large animals, 4018; mange in lab. mice, 4014.

MASTITIS, BOVINE

General Production of staphylococcal antitoxin in the udder, 3; epidemiological patterns, 6; silage and resistance to mastitis, 10; staphylococci from healthy udders, 300; a review, 356; role of teat shape, 982; udder flora, 1324; incidence in Britain, 1574; N.I.R.D. studies, 1309; control measures, 1322; 2796; influence of diet, 2412; mastitis organisms on nozzles of tubes of antibiotics, 2413; re-infection with Str. agalactiae, 2804; predisposing factors, 3460; milk composition, 3463; 3464; eradication scheme, 3841.

Causation Bacillus cereus, 2045; brucella, 1718; Candida, 1059; 3539; Corynebact. pyogenes, 326; 1339; atypical corynebacteria, 325; coli bacilli, 41; 537; 1016; enterobacteria, 1358; Moraxella lwoffi, 2068; mycotic, 2122; Nocardia, 3544; pasteurella, 1348; Pseudomonas, 635; staphylococci, 1; 2; 981; 1320; 2040; 2410-1; 2800; 3122; streptococci, 7; 1676; Group O streptococci, 3840; tuberculous, 2058; bacteria isolated in Algeria, 2114.

Diagnosis California test, 9; 3129; reliability of White-side's and California tests, 8; by cell counts on milk, 1323; 1676; X-ray diagnosis, 3459.

Treatment Vaccine for staphylococcal mastitis, 301; 1319; two new sulphonamides, 532; antibiotics in milk after treatment, 1592; fate of penicillin in udder, 1954.

MASTITIS, CAPRINE Staphylococcal, 2798-9.

MASTITIS, EQUINE Mycotic, 359.

MASTITIS, OVINE Experimental staphylococcal, 302; antibiotic sensitivity of staphylococci, 303; caused by staphylococcus and pasteurella, 1325; in Norway, 2115; corynebacterial, 3143.

MASTITIS, PORCINE Actinomycotic, 1763.

MEDIASTINUM see Respiratory system, diseases.

MELANOSIS In sheep liver, 2306; pigmentation due to Fascioloides magna in cattle, sheep, deer, 1161.

MELIOIDOSIS see Pfeifferella whitmorei infection.

MELOPHAGUS Transmission of foot and mouth virus, 1784; trypanosome in sheep keds, 3205.

MENINGO-ENCEPHALOMYELITIS see Nervous system, diseases.

MEPACRINE For trichomonas in poultry, 376; for fasciola, 2609.

MERCURY Action of Ceresan M on cattle, 1587; poisoning from mersalyl, 1618; vapour inhaled by dog, 1939.

MERSALYL Diuresis in cow, 1618; diuresis in sheep, 2716.

MESOCISTOIDES Cysts in fowl, 3650.

METABOLISM & METABOLIC DISORDERS Nitrogen metabolism in goat, 182-3; gas exchange in pig, 253; metabolism of new-born pig, 548; 1267; of underfed pig, 1556; effect of various metabolites on appetite of cow, 854; balance experiments in cow, 868; acetate metabolism in sheep, 878; 879; environmental temperature in steers, 928; carbohydrate metabolism in young lamb and monkey, 940; metabolism of sulphur compounds, 1317; in cow at high temperature, 1959; metabolism of parturient cow, 1984; disorders in cow, 2679; mineral metabolism in identical twin cows, 4157.

METALDEHYDE Toxicity, 2319.

METAMIDIUM For trypanosomiasis, 3556.

METASTRONGYLUS In pig, 474; 2644; 3312; trials of various anthelmintics in g.pig, 3313; flotation method for eggs, 3660.

METHOXYCHLOR see Parasticides.

METHYRIDINE As anthelmintic, 2244; 2630-3; 2634-6; 3655; reaction to subcutaneous injection in horse, 2245.

METORCHIS In liver of dog, 2559; in liver of duck, 2985.

METRITIS see Genital system, uterus.

METRONIDAZOLE For trichomoniasis, 1080; 1420; action on intestinal protozoa, 3940.

MICE German book on mice as lab. animals, 596; supply of unweaned mice, 1651; oxyuriasis, 2253; management of laboratory colonies, 2779; strain difference in susceptibility to virus, 3217; thymus necrosis caused by virus, 3262; breeding and management, 4220.

See also Choriomeningitis, lymphocytic; Corynebacterium murium; Diarrhoea, murine virus; Digestive system, stomach; Giardia; Haemobartonella; Hepatitis, murine; Kidneys, diseases; Mange; Mycobacterium johnei infection; Neoplasms, general; Salivary glands; Streptococcus infection.

MICROPHthalmia see Eyes.

MICROSCOPY see Technique.

MICROSPORUM see Ringworm.

MILK & MILK PRODUCTS

General Inhaled milk fatal for g.pigs, 1153; cell counts in milk, 1323; 1675; enteroviruses in colostrum and milk, 1472; milk-borne diphasic fever, 1509; pasteurization and tick-borne encephalitis virus, 1107; DDT residues after plant spraying, 1942; heptachlor residues, 1989; Sevin residues, 1990; coumaphos residues, 1991; residues of penicillin and tetracycline, 1261; antibiotics after intramammary infusion, 1592; 3392; streptomycin and chlortetracycline, 1955; penicillin residues, 2366; Bayer 22408 residues, 3279; insecticide residues, 146; 2752; defects of milk diet, 3336; 3351; detection of blood in milk, 3784; anaphylaxis from milk substitute in calves, 2589; excretion of trichlorophen, 2598; excretion of sanguinarine in milk of rabbits, 2709; radiostrontium in milk, 2748; radio-activity in milk, 2749; radio-iodine, 1604; 1935; book on the mammary gland and its secretion, 2791.

Bacterial content Tuberculosis from skim milk, 311; temperatures needed to kill tubercle bacilli, 312; Mycobacterium johnei, 999-1000; brucella, 1369; 2848-9; tubercle bacilli and brucella in milk, 3136.

Colostrum Colostral antibody in swine influenza, 127; Teschen disease antibodies, 2548; antibodies in sow, 3631.

Composition Affected by pasture top-dressing, 499; factors affecting solids-not-fat, 852; electrophoresis of whey proteins, 1678; vitamin B 12 in ewe's milk, 2287; Cu and Fe in sows' milk, 2667; influence of blood group, 3080; composition of mastitis milk, 3460; 3463; 3464; false-positive reactions to test for lactic acid, 3730.

MILK FEVER Vitamin D treatment and prophylaxis, 181; 197; 2288; incidence in Britain, 1574; in France, 2680; in Sweden, 2682; ACTH treatment, 2681; in mare, 3360.

MINERALS Mineral mixtures for cows, 497; mineral status of cattle in Zealand, 499; mineral metabolism during egg laying, 1287.

See also the individual minerals.

MINK Cause of cotton fur, 186; disease booklet, 882; helminth parasites, 1880; anthrax, 2417; diseases in Argentina, 2699; losses in Belgium, 3369; nutrition and reproduction, 4070.

See also Anaemia; Bones, diseases; Clostridium botulinum intoxication; Distemper; Leucosis; Liver, diseases; Neoplasms, general; Salmonella pullorum infection; Tranquillizers.

MITES Malathion for *O. sylvarum*, 803; mites in stored food, 2606; poultry feather mites from India, 3296.

MITOMYCIN Action on virus, 2160.

MIYAGAWANELLA see Psittacosis-Lymphogranuloma group.

MOLLUSCS Control by sodium pentachlorophenate, 466; 807; 2611; copper sulphate dressing toxic for sheep, 1249; *L. truncatula* in Czechoslovakia, 1527; snail host of liver fluke in Japan, 1529; flies control *Limnaea ollula*, 1846; as hosts of *Protostrongylus*, 2645.

MOLYBDENUM Dangers of top-dressed pasture, 187; metabolism in ruminant, 869; poisoning in cattle, 3380.

MONGOOSE see Trypanosoma infection.

MONIEZIA Anthelmintics for sheep, 150; 467; bithionol treatment, 151; treatment with tin arsenate, 820; immunization of sheep, 1878; dichlorophen treatment, 2242; in reindeer calf, 4023.

MONILIASIS see Candida infection.

MONKEYS Book on diseases of lab. primates, 296; metabolism of new-born, 940; proceedings of conference on care and diseases, 967-973; subcutaneous tumour, 1794; fluid and electrolyte therapy, 3388; Russian book on diseases of monkeys, 3723; foamy virus, 3980.

See also Blood, corpuscles; *Corynebacterium ovis* infection; Cocksackie virus; Genital system, placenta; Kyasanur forest disease; *Mycobacterium tuberculosis* infection; Plasmodium infection; Poliomyelitis; Pox diseases, general; Salmonella infection, general; Virus B.

MONOSULFIRAM see Parasiticides.

MORAXELLA BOVIS Strains from animals, 2068.

See also Haemophilus infection.

MOSQUITOES Attracted by lysine on body, 2228; attraction to calf and goat, 2600; dimorphism suppressed by warming the larvae, 3639; transmission of equine encephalomyelitis, 1109.

MOUTH see Digestive system.

MOULTING Effect on Newcastle disease immunization, 3265.

MUCOSAL DISEASE OF CATTLE Rabbits infected with aid of cortisone, 114; relationship with swine fever, 1808; gel diffusion test, 2534; in Ethiopia, 758; in France, 2536; compared with virus of bovine diarrhoea, 2930-1; comparison of American, British and German viruses, 3957; pathology, 1466; 3958.

MUELLERII Capillaris in sheep, 1866.

MULTIPLE BIRTHS Twins from use of PMS in cattle, 3440; metabolism of twin cows, 4157.

MUSGA Feed additives to control houseflies in faeces, 799; 1519; 3287-8; control of face fly on cattle, 3289; 4013; fly transmission of foot and mouth virus, 1784.

MUSCULAR DYSTROPHY In cattle, 190; 4077; heart lesions in calf, 1905; in lamb, 888; 1570; 3349; 3350; 3717; 4077; 4085; in pig, 191; 1218; 3334; 3352; nutritional dystrophy in chick, 865; in duck, 3048; 3725-6; role of vitamin E in rabbit, 2676.

MUSCULAR SYSTEM

General Post-mortem glycolysis in pig muscle, 206; muscular hypertrophy in calves, 2304; glycogen in pig muscle after transport by rail, 2722; response of bovine muscle to electric current, 3037; calcium in muscle of cow and sheep, 3340.

Diseases Necrosis of longissimus dorsi in pig, 892; 3131; 3353; generalized muscle degeneration in pig, 1203; multiple necrotic foal in pig, 2312; effect of under-nutrition in pig, 1555; myopathy-dyspnoea syndrome in calf, 1227; 2692; toxic action of dieldrin, 1240; congenital myopathy in lamb, 3105; chlorides correct experimental myopathies in rat, 185; smooth-muscle lesions in milk-fed rat, 3336; myotonia in goat, 3679; myopathy in quokka, 3705; 'target' abnormality in denervated fibres, 3733; muscular necrosis in turkey, 4100.

MUSCLE RELAXANTS see Anaesthesia.

MUZZLE Histology in cattle, 1622; enzymes in sheep, 2335.

MYCOBACTERIA, GENERAL Methods for grouping and typing, 320; atypical mycobacteria fed to calf, 1329; 2813; specificity of mycobacterial sensitins, 1684; 1685; problem of unclassified mycobacteria, 1687; avian atypical strains, 2055; strains from British cattle, 2058; arylsulphatase-activity, 3142; tissue culture test for virulence, 3478; strains from slaughtered animals, 3845; formamidase test, 3860.

MYCOBACTERIUM JOHNEI INFECTION (JOHNE'S DISEASE)

Sensitizing action of extracts of the bacillus, 23; diagnostic tests compared, 321-2; 2816-7; in buffalo, 323; vitamin K in culture medium, 623; role of phosphorus deficiency, 621; allergy in vaccinated cattle, 622; c.f. test, 322; 997; 1690; 3479; slide culture method, 998; in milk, 999; 1000; vaccination in U.K., 1001; tuberculin reaction in vaccinated cows, 1002; diagnosis by saline flotation method, 1337; experimental in cattle, 1338; experimental in sheep, 3861; pathology, 1688; in an African dwarf goat, 1689; susceptibility of three strains of mice, 2057; PPD johnei, 2058; infective dose for calf, 2425; pathogenesis in calf, 2818; lesions in sheep, 2819; experimental in rat and mouse, 2820; congenital and uterine infection in sheep, 3480; vaccination of sheep, 3861; control in Canada, 1221; in the Congo, 2056; in Kenya, 1311; in Netherlands, 3823; in North Borneo, 1314.

MYCOBACTERIUM LEPRAE INFECTION Bovine leprosy in a Friesian cow, 324.

MYCOBACTERIUM TUBERCULOSIS Blood agar for bovine type, 19; pasteurization of milk, 312; typing strains on skin of rabbit, 318; allergenic properties of components, 1328; susceptibility to gamma rays, 2877; typing by Lebek's method, 3477; studies on isolation, differentiation and variability, 3827; nutrients in bovine serum, 3846; types of closures for culture tubes, 3847; niacin test, 3850.

MYCOBACTERIUM TUBERCULOSIS INFECTION

General Effect of intercurrent moniliasis, 20; Tego-51 as disinfectant, 616; symposium of zoological society, 994; in horse, sheep, goat, pig, dog, and cat in U.K., 995; in wild animals, 1757; immunity after intra-uterine infection of mice, 2053; in the Congo, 2056; monograph on pathology, 2786; in alpaca in Peru, 3138; in deer, 3140; in wild bison, 3141; in mink, 3369; Russian work, 3475; age and susceptibility of g.pig, 3851; fate of bacilli in immunized mouse, 3854; murine type in cat, 316.

Birds Infection of poultry buildings and runs, 317; general account, 618; agglutination test for fowl, 619; 996; blood picture in fowl, 1336; in bones of fowl, 1680; action of BCG on chick, 1686; atypical strains, 2055; in brain of fowl, 2815; pathology, 3476; thyroid and tuberculin reaction, 3856; influence of fat in diet, 3857-8.

Cattle Genital infection, 308; from skim milk, 311; avian type, 614; 3137; 3855; types from slaughtered cattle, 992; action of vole bacillus (M vaccine) on cattle, 1335; electrophoresis of whey proteins, 1678; pathology, 2048; blood composition, 2422; re-infection of clean herds, 1679; 3135; 3471; isoniazid treatment, 3848; in Bermuda, 1313; in Germany, 2047; 3473; in Netherlands, 3447-8; 3823; in New Zealand, 2394; in Nigeria, 2420; in Switzerland, 17; 309; in U.K., 4209; in U.S.A., 1327; 2421; in Venezuela, 3472.

Diagnosis (other than tuberculin test) Gel diffusion test on bovine sera, 18; Middlebrook's test on cattle, 310; chick inoculation method for faeces and soil, 620; slide agglutination test, 996; c.f. test on cattle, 2809; haemagglutination tests, 2814.

Diagnosis (tuberculin test) Reactions of cattle infected with avian type, 313; 614; 1683; mixed purified tuberculin, 314; production of sensitivity in g.pig, 315; history of test in U.K., 612; interpretation in cattle, 613; 1682; acid fractions tested on g.pig, 615; multiple simultaneous injections and reaction size, 991; false-positive from contact with infected humans, 993; best dose of tuberculin and effect of simultaneous injections, 1329; reactions to diluted tuberculin, 1330; 2049; French procedure, 1331; comparative tests on children, 1332; Italian PPD, 1681; by jet injection in cattle, 2025; non-specific reactions attributed to staphylococcus, 2050; human versus bovine tuberculin for cattle, 2051; action of tuberculin fractions on cattle, 2052; South African experience, 2423; cortisone and the test in cows, 2424; attempts to sensitize sheep, 2424; comparison of tuberculins, 2810; active sensitization to tuberculin, 2811; effect of ischaemia, 2812; reactions of calves infected with avirulent mycobacteria, 2813; reaction of cattle with actinobacillosis, 3547; a review, 3844; non-specific sensitization, 3845; on dog, 3849; influenced by thyroid extract in fowl, 3856.

Dog Types found in Japanese dogs, 319; tuberculin test, 3849.

Horse Mechanism of resistance, 307; diagnosis, 3470.

Man Source of tuberculin allergy in cattle, 993; bovine type infection, 2054; infection from attested cattle, 3138; 3471; avian type infection, 3859.

Swine Infection from skim milk, 311; types from slaughtered pigs, 992; in lymph nodes, 3139; in Denmark, 3363; in Germany, 3473; in South Africa, 3852.

Treatment Isoniazid for fowls, 22; antibiotic extract from an aspergillus tried on cattle, 617; isoniazid and immunity in mice, 1333; isoniazid and the tuberculin test, 3474; isoniazid therapy in monkey, 3853.

- MYCOPLASMA GALLINARUM** see Chronic respiratory disease; Pleuropneumonia-like organisms.
- MYCOPLASMA GALLISEPTICUM** see Chronic respiratory disease; Pleuropneumonia-like organisms.
- MYCOPLASMA MYCOIDES** see Pleuropneumonia, bovine.
- MYELOBLASTOSIS** see Fowl paralysis.
- MYOCLONIA** see Nervous system, diseases.
- MYOHAEMOGLOBINAEMIA EQUINE PARALYTIC** Role of pancreas, 1912.
- MYOPATHY-DYSPTNOEA SYNDROME** In calf, 1227; 2692.
- MYXOMATOSIS** In *Sylvilagus bachmani*, 781; electron microscopy of lesions, 782; in Denmark, 1493; in Australia, 1817; 2199; 2563; in Venezuela, 3607; incubation period, 3974.
- MYXOVIRUSES** see Viruses, general.
- NEGUVON** see Trichlorphon.
- NEMATODIRUS** Bephenium treatment, 156; diethyl-carbamazine treatment of sheep, 1858; separating eggs from faeces, 2651; passage of *N. battus* eggs through alimentary canal, 2997; effect on weight gain of lamb, 2999; in sheep in New Zealand, 2998; 3309; in sheep in Yugoslavia, 4043.
- NEOMYCIN** Action on various bacteria, 661; in pullorum disease, 2442.
- NEOPLASMS**
- General** In animals in Israel, 483; survey of neoplasms in English farm animals, 837; in domesticated mammals examined at Leipzig, 1881; 3320; survey of neoplasms in horse, dog, cat and birds seen at Vienna, 1882; lympho-reticulo-lytic sarcoma in hamster, 844; malignant melanoma in hamster, 4059; lung cancer in camel, 1191; transmissible cutaneous tumour in hare, 1494; in Zoo birds, 2260; hepatoma in duck, 2264; 3669; bronchiolar carcinoma in mink, 3008; 3043; anti-tumour action of fatty acids, 489; sarcoma in pyridoxine-deficient mouse, 1195; in germ-free rat and mouse, 2257; rabbit fibroma transmitted by nematodes, 2562; electron microscopy of tumour viruses, 2654; book on pathology of tumours, 2787; in genital organs of laboratory rat, 3009; treatment by injection of non-pathogenic clostridia, 3323; lab. animals for cancer research, 4062; in elephant and other animals, 4090.
- Cat** Brain sarcoma, 165; mastocytoma of spleen, 843; eye tumour, 846; tumour survey, 1882; venereal tumours, 4058.
- Cattle** Reticulo-endothelial, 164; pituitary adenoma, 155; cartilaginous tumours, 166; survey of tumours, 837; melanoma of skin, 838; wart vaccine, 1124; fibrosarcoma of pericardium in zebu, 1192; multiple lipomas, 1583; lymphosarcoma in a herd, 2263; neurinoma, 2652; 3671; cancer eye, 3010; of pancreas, 3321; papilloma in tattooed ears, 3593; of heart, 4057.
- Dog** Reticulo-endothelial, 164; brain tumours, 165; 583; of testicle, 167; 487; pituitary adenoma, 168-9; primary lung tumours, 485; plasma-cell tumours of bone, 486; oral papilloma, 776; 777; biliary tract carcinomas after Aramite administration, 839; ovary, 488; 3007; pancreas, 841; skin, 1193; odontoma plus carcinoma, 842; eye tumours, 845; treatment by antibody labelled with radio-iodine, 1194; Sticker's sarcoma, 1545; 2261; tumour survey, 1882; mammary carcinoma, 1884; intra-abdominal including liver, spleen, ovaries, 1885; treatment by temporary ligation, 1886; lung cancer, 2258; malignant lymphoma, 2655; stilboestrol for perianal tumours, 2656; osteosarcoma, 3006; mast-cell tumours treated with prednisone, 3322; of heart, 3668; neurosarcoma, 3672; lymphatic leucosis, 3674; venereal tumours, 4058.
- Fowl** Arrhenoblastoma of ovary, 846; incidence in Netherlands, 884; Rous sarcoma, 847; 1546; 1826; 2212-4; haemangioma, 4060; induced by chemicals, 4061.
- Goat** Pulmonary papilloma, 2262; melanoma of eye, 3005.
- Horse** Neoplasms of testicle, 167; lung cancer, 484; survey of tumours, 837; 1882; stomach carcinoma, 1190; bile duct carcinoma, 3670.
- Sheep** Cartilaginous tumours, 166; survey of tumours, 837; in the nose, 2259.
- Swine** Survey of tumours, 837; transmissible genital papilloma, 2653.
- Turkey** Rous sarcoma, 1547; 2211.
- NEORICKETTSIA** see Psittacosis-Lymphogranuloma group.
- NERVOUS SYSTEM**
- General** Tonic immobility or hypnotic state in farm animals, 1305; conference on the c.n.s. and behaviour, 2033; source of efferent fibres to bovine stomach, 270; histology of ganglia in sheep with scrapie, 1802; autonomic system and immunity, 3276; partial vagotomy in sheep, 3777.
- Brain** Tumours in animals, 165; neurosecretion in pig hypothalamus, 262; anatomy of hypothalamus in sheep and goat, 559; granular structures in normal dog, 934; entry of listeria along facial nerves in sheep, 1008; toxoplasma lesions in pig, 1090; swine fever lesions, 1127; cerebrocortical necrosis in cattle and sheep, 1243-4; changes in hypothalamus of pig with virus infection, 1484; Elaphostomylus in reindeer, 1861; action of dieldrin, 1941; glycogen and copper in sheep brain, 2182; brain temperature in cattle, 2334; TB in fowls, 2815; lesions in listeriosis, 2822; homologous brain suspension injected into dog, 4098; histology of infundibulum in cattle, 4172.
- Cerebrospinal fluid** Mg and Ca content, 219; examination of fluid from horse and sheep, 227; in Teschen disease, 2550; occipital puncture in pig, 2780.
- Diseases** Tetany experimentally produced in horse, 2270; infectious meningo-encephalitis in cattle, 40; polio-encephalomalacia in cattle, 1915; ataxia in cattle during drought, 2661; neurinoma in cattle, 3671; sporadic meningo-encephalitis in cattle, 3732; 3956; visna in sheep, 425; encephalomalacia in sheep, 887; Candida infection in sheep, 2880; pathology of swayback, 3343; streptococcal infection in pig, 1326; 3642; congenital myoclonia in piglet, 2310; tremor in piglet, 3367; lesions in shock-like and rheumatoid disorders in pig, 3721; epileptiform fits in dog, 3042; meningo-encephalomyelitis in turkey, 2959; encephalomalacia in turkey, 4100; allergic encephalomyelitis in fowls, 2587; arginine deficiency in chick, 1205; paroxysm in fowl, 4402; neurotoxic organophosphorus compounds in fowl, 4132; myelinolytic mechanisms, 1936; action of copper compounds injected into c.s.f., 3734; cerebral nematodes in deer, 4050; demyelination in Poodle puppy, 4097.
- Peripheral nerves** Anatomy of vagus in fowl, 269; electron microscopy in fowl paralysis, 1197; pathology of intramural ganglia in horse, 1576; of preputial muscles in bull and ram, 2352; mechanism of anaesthetic block, 4142.
- Spinal cord** Spondylitis in pig, 894; anatomy in sheep, 1983; neurosarcoma in dog, 3672.
- NETHERLANDS** Diseases of animals, 2399.
- See also Abortion, ovine virus; Babesia infection, cattle; Duck plague; Foot and mouth disease; Fowls, diseases general; Newcastle disease; Salmonella infection, cattle; Toxoplasma infection.
- NEW-BORN ANIMALS** Inflammatory reaction in calf, 252; methods of anaesthesia, 542; carbohydrate metabolism in lamb and monkey, 940; transfer of sensitivity in rabbit, 1832; anoxia and survival, 1962; intestinal absorption in rat, 1964; glucose in umbilical blood of pig, 2735; antibody formation in guinea-pig, 3634; thermoregulation in lamb, 4147.
- NEWCASTLE DISEASE**
- General** In jackdaw, 1495; in parrot, 1819; in sparrow and canary, 3613; in turkey, 3982; in pigeon, 3983; treatment with hydrocortisone, 2567; influence of vitamin A, 2956; symptomless form, 3981; in Congo, 443; in Indonesia, 3986-7; in Netherlands, 2985; in Sarawak, 1660; in Sierra Leone, 589; in U.K., 3984; 4209.
- Diagnosis** By presence of lymphopenia, 444; tissue culture method, 451; virus in leucocytes during pre-clinical stage, 453; rapid plate agglutination test, 1496; H.I. titre of vaccinated fowls, 784; standardization of HI test, 3264; gel-diffusion test, 3988.
- Immunology** Resistance not transferred to offspring of immunized hens, 445; vaccine from virus exposed to high temperature for short time, 783; Komarov vaccine in Nigeria, 1135; comparison of vaccines, 1136; 2957; routes of immunization compared, 1137; use of hyper-immune serum, 1497; drinking-water Strain F vaccine, 1499; freeze-dried vaccine, 1500; drinking-water vaccine, 1823; protective value of gamma globulin, 1824; beta-propiolactone vaccine, 2202; 2565; efficacy of vaccines, 2203; role of yolk in egg vaccine, 2206; live vaccine contaminated with virulent virus, 2566; vaccines in Jamaica, 2784; effect of moult on immunization, 3266.
- Virus** Tissue culture, 134; 2207; pathogenicity for hamsters, 442; concentration by kaolin, 1138; attenuation by tissue culture and passage in rabbits, 1498; passage in new-born rabbits, 1499; action of virus on dogs, 1501; attempt to change into fowl plague virus, 1818; not in aqueous humour, 1820; survival in earthworms, 1821; RNA fractions not infective, 1822; compared with fowl plague, 2564; 3612; cells infected with small inocula, 2568; titration by fluorescent antibody method, 2954; sub-units, 2960; properties of virus isolated in Venezuela, 3263; cell culture of Hitchner's strain, 3265; comparison of Strain F, Strain B-1 and a virulent strain, 3614; spread in the body, 3615; survival of freeze-dried Strain F, 3616; adsorption on blood platelets, 3617.
- NEW ZEALAND** see Echinococcus; Infertility, cattle; Leptospira infection, cattle; Nematodirus; Reports.
- NICARBAZIN** Therapeutic and toxic doses for fowls, 3068; treatment of coccidiosis, 1775; 2142; 2897.
- NICOTINE** see Anthelmintics.
- NIGERIA** see Helminth parasites, cattle; Mycobacterium tuberculosis infection; Newcastle disease; Pleuropneumonia, bovine; Reports.

- NIPPOSTRONGYLUS** Pathology in rats, 1542; 2621; transmits rabbit fibroma, 2562.
- NITRATES** see Potassium nitrate.
- NITRITE** see Poisoning.
- NITROFURANTOIN** Sensitivity of salmonella, 1360.
- NITROFURAZONE** For coccidiosis, 378; 1422; 2141; 2897; 3927; for salmonellosis, 2077; toxicity for turkey, 2324; therapeutic and toxic doses for fowl, 3068.
- NITROPHENIDE** Therapeutic and toxic doses for fowl, 1777; 3068.
- NOCARDIA** Hepatitis in horse, 674; bovine mastitis, 2122; 3544; bovine farcy in Sudan, 2887; bovine infection in Venezuela, 3199; *N. brasiliensis* from cat, 3200; properties and drug-sensitivity of *N. asteroides*, 3911.
- NORTH BORNEO** see Reports.
- NORWAY** see Mastitis, ovine; Reports.
- NOSE** see Respiratory system.
- NUCLEOCIDIN** see Trypanosoma infection, treatment.
- NUTRIA (MYOCASTOR COYUPUS)** see Fasciola; Heterobilharzia; Salmonella infection; Salmonella pullorum infection.
- NUTRITION & NUTRITIONAL DISEASES**
- General Nutrition and longevity, 851; 1554; meat diet and Ca deficiency in rat, 1214; starvation and early pregnancy in mouse, 1634; osteomalacia in horse, 3675; French book on animal nutrition, 3828; fats in mink rations, 4070.
- Cat Low-protein diet and serum proteins, 1561; faults of meat diet, 2271-2.
- Cattle Mineral mixtures, 497; 3025; under-feeding and uterine changes, 571; nutritional infertility, 572; harmful effects of concentrates, 1559; action of sugar-beet leaves, 1890; effects of excessive protein, 2274; nutrition and mastitis, 2412; acute overeating with cereals, 3681; effects of wood shavings on calf, 3694; mineral deficiencies in Brazil, 4071.
- See also Calcium; Copper; Growth, general; Magnesium; Phosphorus; Zinc.
- Dog Illness in dogs fed beaver meat, 3327.
- Fowl Bumblefoot and dried yeast, 493; encephalomalacia from fats, 864; mortality and unrestricted diet, 1199; continuous feeding compared with restricted mealtimes, 1893; undernutrition, 2284; fish meal and hatchability, 2662; fats, 2663; role of grit, 2664; starvation and the ovary, 3102; influence of protein on infection, 3165; fish solubles, 3331; fat in diet and resistance to disease, 3857; 3858; Ca requirements of broilers, 4082.
- See also Amino acids; Cobalt; Encephalomalacia; Magnesium; Zinc.
- Sheep Rape-seed oil meal safe, 2665; role in helminthiasis, 2626; 3307; acute overeating with cereals, 3681; indigestion from excess starch, 3682.
- See also Cobalt; Copper; Magnesium.
- Swine Undernutrition, 1555-6; 4064; influence on swine fever immunity, 123; yellow fat, 178; atherosclerosis, 1201; vitamin supplements, 3029; cereal fat and disease, 3334; physiology of piglet nutrition, 3337-8; diets low in tocopherol and fatty acids, 3704; low nutrition and the endocrine system, 1285; diet and reproduction, 1316; 2266-7; influence on Teschen disease, 2545; 2546; and lung oedema, 2694.
- See also Copper; Copper sulphate; Iron; Muscular dystrophy; Vitamin A; Vitamin B.
- NYASALAND** see Reports.
- NYSTATIN** Action on protozoa, 697.
- OEDEMA DISEASE OF FOWLS** Clinical pathology, 2273.
- OEDEMA DISEASE OF SWINE** Pathogenesis, 1922; calcium chloride therapy, 1924; field observations, 2069; subcutaneous oedema in piglet, 3720; in Southern Rhodesia, 3868.
- See also Escherichia coli infection.
- OENANTHE** see Poisoning, plants.
- OESOPHAGOSTOMUM** Cultivation, 824; 1858; immunity in calf, 1177; peritonitis in goat, 2986; pathogenic action of radiatum in cattle, 4040.
- OESOPHAGUS** see Digestive system.
- OESTRADIOL** see Sex hormones, oestrogens.
- OESTRIDAE**
- Dermatobia Control of *D. hominis* on cattle, 1155; 4010.
- Gasterophilus Oesophageal stenosis in foal, 3285; incidence in horse in Venezuela, 3286.
- Hypoderma Immunization of cattle, 461; oviposition on cattle, 1839; *H. bovis* in Texas, 2594; development of lineatum in cattle, 2973; control in Netherlands, 2974; test of 17 organic phosphorus compounds on cattle, 1840; Bayer 29493 and Bayer 22408 treatment, 2595; coumaphos treatment, 1154; 2596-7; 3283; dimethoate treatment, 2976; phenothiazine treatment, 2977; ronnel, Dowco 109 and Dowco 105 treatment, 2593; 3283; Ruelene treatment, 798; 2595; 2975; 3283; 4008; trichlorphon treatment, 1154; fenchlorphos treatment, 4008.
- Oestrus Treatment of sheep with organophosphorus compounds, 2972; 3828; 4007.
- OESTROGENS** see Sex hormones.
- OESTRONE** see Sex hormones, oestrogens.
- OESTROUS CYCLE** see Genital system.
- OGMOCOTYLE** Indica in sheep, 1162.
- OLLULANUS** In cats in Sydney, 157.
- OMASUM** see Digestive system, ruminant digestion.
- ONCHOCERCA** In fistulous withers, 481; 1187; *O. armillata* in sheep, cattle and buffalo, 482; microfilariae in cow, 1876.
- OPHTHALMIA, EQUINE PERIODIC** Role of leptospirae, 70; 2870.
- OPHTHALMIA, OVINE CONTAGIOUS** see Rickettsia infection.
- ORCHITIS** see Genital system, testicle.
- ORNITHONYSSUS** see Mites.
- ORNITHOSIS** see Psittacosis.
- OSTEOARTHRITIS** see Joints.
- OSTEODYSTROPHY** see Bones, diseases.
- OSTEOMALACIA** see Bones, diseases.
- OSTEOPETROSIS, AVIAN** see Fowl Paralysis.
- OSTEOPOROSIS** see Bones, diseases.
- OSTERTAGIA** Survival of larvae on pasture, 1180; larvae in artificial media, 1858; anthelmintics, 2990; 3655.
- OVA & OVULATION** see Genital system, ovary.
- OXYGEN** Consumption of cattle in hot climate, 247; anoxia of new-born animals, 1962.
- OXYTETRACYCLINE** Action on *E. rhusiopathiae* in mice, 31; for coccidiosis in sheep, 700; residues in fowls fed high levels, 862; bacteriological examination of treated pig, calf and duck, 2120; in pullorum disease, 2442; enhances egg production, 3680; in infectious coryza of fowl, 3151.
- OXYTOCIN** see Pituitary gland, posterior hormones.
- PAKISTAN** see Foot and mouth disease.
- PANAMA** see Leptospira infection.
- PANCREAS** Cysts in lambs, 215; nutritional hypertrophy, 496; tumour in dog, 841; acute necrosis in pig, 893; isoantigens in rabbit, 1514; physiology in sheep, 1614-6; 4170; role in equine paralytic myohaemoglobinemia, 1912; action of drugs on fowl, 2328; neoplasia in cattle, 3321; haemolysis and amylase in pig pancreas, 3599; A and B cells in pregnant cows, 3776.
- PANLEUCOPENIA, FELINE** see Enteritis, feline.
- PANTOTHENIC ACID** see Vitamin B.
- PAPILLOMA** see Neoplasms.
- PAPUA & NEW GUINEA** Diseases of animals, 2290.
- See also Blowflies; Infertility, cattle.
- PARAGUAY** FAO report, 3711.
- PARA-INFLUENZA** Para-influenza 3 in Swedish cattle, 422; para-influenza 3 antibodies in cattle, 423; 3592; properties of bovine para-influenza 3 virus, 2178; 2927; virus pneumonia in calves, 3560; virus from shipping fever, 3961; vaccine for cattle, 2926; 3962-3.
- PARALYSIS & PARESIS** Spondylitis in pig, 894; coli toxin and paresis in cow, 1349; spastic paresis in cattle, 3037; 3439.
- PARASITICIDES**
- General Nine compounds tried against lice on cattle, buffalo and goat, 460; repellents for cattle flies, 1156; chlorpin, 1158; Bayer 23129 and 29493 and Stauffer R-2371 against ox warbles, 1840; Bayer 29493 and 22408 for ox warbles, 2595; metabolism of Bayer 22408 in cows, 3279; Bayer 22408 for control of fly larvae in bovine faeces, 3287; 3288; Bayer 37342, 4007; determination of organophosphorus compounds in food, 1993; ticks resistant, 2230; silica aerogel for ectoparasites, 2592; residues in meat and milk, 2752; control of face fly on cattle, 3289; hexamid B and polychlorpinene as repellents, 4011; 4012; repellents for face flies, 4013; monosulfiram and DMC for parasites of mice, 4014; dipping better than jetting for sheep itch mite, 4015; depletion of sheep dips, 4016.
- Aldrin Poisoning in pig, 3062; depletion in dip fluids, 4016.
- Benzene hexachloride (BHC) Puppies poisoned by BHC applied to bitch, 530; poisoning in cattle, 3235; chemical determination, 3064; residues in fowl after spraying of house, 3291; depletion in dip fluids, 4016-7.
- Coumaphos (Asuntol) For ox warbles, 1154; 2596-7; 3283; for horn flies, 2597; for sheep nostril fly, 2972; 3282; coumaphos for ticks, 801; 3293; as anthelmintic, 1178; excretion in cows' milk, 1991; residues in tissues and eggs of fowl, 1992; for control of fly larvae in bovine faeces, 3287; 3288; toxicity for cattle, 3386.
- DDT Action on *Bombus microphilus*, 1521; in milk after plant spraying, 1940; for lice on fowl, 3280; toxic for kangaroo, 4130.
- Delnav Metabolism in cattle, 147.
- Diazinon For sheep blowflies, 1518.
- Dichlorvos (DDVP) Toxicity for cows, horses and rats, 230.
- Dieldrin Action on muscles of rat, 1240; for sheep blowflies, 1518; poisoning in sheepdog, 1940; action on brain, 1941.

PARASITICIDES—[cont'd.]

- Dimethoate** For *Dermatobia hominis* in cattle, 1155; 4010; for ox warbles, 2976; toxicity, 916; 2981.
- Dowco 105** Toxicity for horses, 143; for ox warbles, 1840; 2593.
- Dowco 109** For ox warbles, 2593; 3283; for sheep nostril fly, 2972.
- Endrin** Residues on maize, 3063; residues in grazing lamb, 4131.
- Heptachlor** Epoxide fed to cow, 1989.
- Malathion** Residues on lucerne and in milk, 146; for notoedric mange in cat, 463; for fowl mites, 803; residues in sheep, goat, pig, 804; toxicity for hen, 915; metabolism in cow, 1841.
- Methoxychlor** Action on uterus of rat and mouse, 2377.
- Parathion** Detection methods, 1589; action on pig, 2316; toxicity for fowl, 914; 1944; 2317.
- Ronnel (fenchlorphos)** Toxicity for horse, 143; against ticks, 801; for demodectic mange, 1625; for ox warbles, 2593; 4008; for control of fly larvae in bovine faeces, 3287-8.
- Ruelene** As anthelmintic, 1174; 1179; for sheep nostril fly, 2972; for ox warbles, 708; 2595; 2975; 3283; 4008; metabolism in sheep, 4046.
- Savin** Toxicity, 1943; fed to cow, 1990; uses in animals, 2971.
- Toxaphene** Residues on grass, 145.
- Toxicity** Mercaptophos poisoning in cattle, 526; mode of action of organo-phosphorus, 3387; cholinesterases in cattle given a phosphoramide, 3749; organic phosphorus compounds in horse, 143; carcinomas from Aramite in dog, 839; liver lesions from Aramite in rat, 840; chronic toxicity of seven compounds for hen, 915; of six compounds for rat, 916.
- Trichlorphon (Dipterex)** Toxicity for hen, 915; toxicity for rat, 916; for ox warbles, 1154; excretion in milk, 2598; for demodectic mange in dog, 2604; mixed with coumaphos for *Gestrus ovis*, 3282; for *Dermatobia*, 4010.
- PARATHION** see *Parasiticides*.
- PARATHYROID GLAND** Morphology and calcium metabolism, 264; and Ca deficiency in rat, 1280; renal action of gland extract, 1281; hormone assay, 1981; bovine hormone, 2357; and Ca metabolism in fowl, 3341; function in dog, 4182.
- PARROTS** see *Fungi*, diseases; *Penicillin*; *Psittacosis*; Wild animals and birds.
- PARTHENOGENESIS** In turkey, 1643; 2003; 2211.
- PARTRIDGES** see *Candida albicans* infection; *Psittacosis*; *Salmonella* infection, avian.
- PARTURIENT PARESIS** see *Milk fever*.
- PARTURITION** Changes in blood progesterone, 288; decreased sensitivity to tuberculin, 1002; effect of clamping umbilical cord, 1293; puerperal sepsis in sow, 1350; metabolism of parturient cow, 1984; neostigmine or pituitrin for inertia in sow, 2007; disorders in sow, 2773; action of oxytocin combined with ergometrine, 3390.
- PASTEURELLA HAEMOLYTICA** Pathogenicity for lamb, 1697; virulence for sheep, 632; 3489; in ovine mastitis, 2116; ovine strains, 2433; pneumonia in Southern Rhodesia, 3489.
- PASTEURELLA INFECTION**
- General** Recent advances, 35; report of FAO meeting, 36; in buffalo, 630; 3449; in duck, 2065; in horse, 2823; in lungs of rabbit, 3901; hyaluronidase, steroids and Past. multocida abscesses in g.pig, 1012; capsule polysaccharides of multocida, 1013; lipopolysaccharides of multocida, 2432.
- Cattle** Oil adjuvant and alum vaccines, 37; 2431; mechanism of immunity, 630; naturally acquired immunity, 631; pathology, 1009; vaccine production, 1011; mastitis, 1348; shipping fever, 2537; in calf, 2824; book on haemorrhagic septicaemia, 3449; after transport, 3812.
- Fowl** Live vaccine, 1700; atypical respiratory infection, 634; vaccine production, 1011; killed vaccine, 1699; 2434.
- Sheep** see *Pasteurella haemolytica*.
- Swine** Primary infection, 633; effect on cholinesterase, 870; aetiology of coughing, 1010.
- PASTEURELLA MASTITIS** In ovine mastitis, 1325.
- PASTEURELLA PSEUDOTUBERCULOSIS INFECTION** Lung lesions in cat and rodents, 903; in guinea pig, 1698; in duck, 2064; ocular infection in guinea-pig, rabbit and cat, 3490.
- PASTURES** Survival of nematode larvae, 1180; natural radio-activity, 1234-6; influence on blood minerals in bullock, 1555; selective grazing by sheep, 1646; pasturing of sow, 2267; contamination by industry, 2315; radio-strontium contamination, 2748; molybdenum content, 3380; mineral content and bovine fertility, 3688; mineral content and animal health, 3689; changes in blood electrolytes of newly-pastured cow, 4066.
- See also *Facial eczema*; *Lungworms*.
- PATHOLOGY** see *Books*, pathology.
- PECUDIN** For bovine brucellosis, 1029; 1371; 1726-7.

PENICILLIN As growth factor, 176; fate in rumen, 571; action and uses of BRL 1241 (celbenin), 535-7; 1953; blood levels from benzathine and benethamine compounds in sheep, 919; 1956; fatal shock in parrot, 1063; fate in bovine udder, 1954; 4136; excretion in milk, 1261; 2366; toxicity for guinea-pig, 3072; 3393; staphylococcal penicillinase, 3461; comparison of penicillins against staphylococci, 3462; labelled with Brilliant Blue for intramammary use, 3750; effect on endocrine and digestive systems of rat and chick, 3751; test for, 3785.

PENTACHLOROPHENOL see *Poisoning*; *Sodium pentachlorophenate*.

PENTOBARBITONE see *Anaesthesia*.

PERITONEUM Nematode peritonitis in goat, 2986.

PERU Diseases of cattle, 1914.

See also *Altitude*; *Catarrh*, bovine malignant; *Mycobacterium tuberculosis* infection, general.

PFEIFFERELLA MALLEI INFECTION (GLANDERS) In Sierra Leone, 589; experimental infection of horse, 1692; antibiotic treatment of guinea-pig, 2060.

PFEIFFERELLA WHITMORI INFECTION (MELIOIDOSIS) In pig in Cambodia, 1004; in large intestine of goat, 3482; experimental in rabbit, 3483; in man and animals in Queensland, 3445; c.f. test, 3863.

PHAGOCYTOSIS In brucellosis, 62; by cultured cells, 663; by RES cells, 1272; 4162; of salmonella, 3875.

PHALARIS see *Poisoning*, plants.

PHEASANTS Tuberculosis, 1757; helminths, 3002; ground-nut poisoning, 4118.

PHENANTHROLINE As intestinal bactericide, 3069.

PHENOL see *Poisoning*, organic poisons.

PHENOTHIAZINE And metabolism of nematode larvae, 1175; for *Balantidium* infection, 1781; synergy with organophosphorus, 2332; role in pulpy kidney disease of sheep, 2458; bibliography, 2627; resistant helminths, 1855; 2628; ineffective against ox warbles, 2977; synergized with coroxon, 2993.

See also *Anthelmintics*.

PHOSPHORUS Imbalance in goat, 182-3; amount in blood of cattle, 551; deficiency and Johne's disease, 621; deficiency in horse and cattle, 2263; radiophosphorus in cow, 2301-2; in blood of lion, 2342; metabolism in sheep, 2672; 3695; metabolism in hen, 3019; supplements for cattle, 4072; metabolism in identical twin cows, 4157.

PHOTOSENSITIZATION In cattle from lucerne, 853; in fowl from Ammi visnaga, 1256; from clover in turkey, 2323; pathology of Geeldkopp in sheep, 2713; facial eczema, 238-9; 1949; 3196.

PHYTOLITHS In sheep rumen, 2338; 3771-2.

PIGEONS see *Anatomy*; *Encephalomyelitis*, equine; *Newcastle disease*; *Salmonella* infection, birds.

PINEAL BODY Anatomy in dog and cat, 560.

PIPERAZINE see *Anthelmintics*.

PIROPLASMOSIS see *Babesia* infection.

PITHOMYCES Action of toxin on rabbit, 1949; sporidmin labelled with radiol sulphur, 1950; numbers of spores on pasture, 3196.

PITUITARY GLAND

General Adenoma in dog, 168-9; histology in pig, 262; 1285; the corpus luteum-pituitary relationship, 265-8; in sick pig, 518; anatomy in sheep and goat, 559; changes in pig with virus infections, 1484; histopathology in cow, 1466; 2289; hypophysectomy in goat, 3819.

Anterior hormones Content of FSH and LH in ewe, 289; seasonal changes in LH in ewe, 952; fractions of LH from ewe, 1639; porcine growth hormone, 1282; properties of bovine and ovine growth hormone, 2742; hormones in fowl, 2378; role in lactation, 3760; action on ovary of pregnant cow, 3792.

Posterior hormones Oxytocin plus ergometrine in obstetrics, 3390; effect of oxytocin on corpus luteum in cow, 287.

PITYROSPORUM see *Fungi*.

PLASMA CELLS Leukaemia in mink, 1550.

PLASMODIUM INFECTION In penguin, 381; in monkey, 2145; synergy with coccidia, 2898; staining by fluorescent antibody, 2899; human infection with monkey plasmodium, 3562; eyelid lesions from gallinaceum in chick, 3932; paralysis from juxtanuclear in chick, 3933; in fowl in U.S.A., 3934.

PLEUROPNEUMONIA, BOVINE CONTAGIOUS Report of FAO/OIE meeting, 367; specific polysaccharide, 368; c.f. test, 676; 2130; experimental in calf, 677; migration of agent along lymphatics, 678; intradermal immunization, 679; immunization by injection into muzzle, 1073; antibiotic therapy, 1074; egg vaccine, 1310; stability of freeze-dried vaccine, 1765; culture of causal organism, 1766; 3913; titration of avianized vaccine in cattle, 2472; tail-tip immunization of calf, 2473; 2474; polyglycerophosphate from PPLD, 2475; opsonins and phagocytosis, 3201; in Australia, 585; 675; 3445; among zebu cattle in French Equatorial Africa, 366; control in Kenya, 1409; in Nigeria, 1072; 4212; in Sudan, 3912; in Tanganyika, 1659; in Uganda, 2395.

- PLEUROPNEUMONIA, CAPRINE CONTAGIOUS** In Ethiopia, 83.
- PLEUROPNEUMONIA-LIKE ORGANISMS** Proceedings of conference of New York Academy, 681; Glaesser's disease in pig, 659; 660; in nasal cavities of pig, 2191; from genital and respiratory tracts of cattle, 682; septicaemia and arthritis in goat, 693; PPLO from agalactia-like disease of sheep, 3202; 3914; sensitivity to antibiotics of avian PPLO, 370; 1767; agglutination test for avian infections, 687; classification of avian strains, 689; 690; in chronic respiratory disease, 691-3; 2478; from avian synovitis, 2479; sinusitis in turkey, 2480; Mycoplasma gallisepticum, 3554; in Australian fowl, 3916; Mycoplasma inouum from fowl, 3917; PPLO in cell cultures, 680; reversion to bacterial forms, 684-6; nomenclature of PPLO, 1412; 1413; comparison of 15 strains, 2476; cultural requirements, 3553; action of PPLO on cell metabolism, 3915.
- PNEUMOCOCCUS** see *Streptococcus pneumoniae*.
- PNEUMOCYSTIS** Pneumonia in dog, 715; in hare, 1428.
- PNEUMONIA** see Respiratory system, diseases.
- PNEUMONIA, BOVINE VIRUS** Neorickettsial, 115; 419-421; 3627.
- PNEUMONIA, PORCINE VIRUS** Tetracycline therapy, 431; 1129; Swedish control scheme, 432; histopathology, 770; in Bulgaria, 1486; 3255; in Lithuania, 1486; German studies, 2558; in Slovakia, 3256; control in Ontario, 3364.
- PNEUMONITIS, FELINE VIRUS** Variants of the virus, 440; infections from cell walls, 2196.
- POISONING**
- Inorganic poisons** Thallium in dog, 525; 2704; nitrate in cattle, 907; potassium nitrate in sheep, 1250; toxicity of barium salts for fowl, 908; copper in pig, 1207; 4112-3; copper in sheep, 1249; 4114; sodium selenite in pig, 908; sodium selenite in cattle, 1211; arsenic in sheep, 1558; arsenic in cattle, 2337; mercury vapour inhaled by dog, 1939; selenium in mouse, 2705; iron in piglet, 2706; molybdenum in cattle, 3380; ammonia in mixture of urea and soya bean meal, 3383; nitrates and nitrites in water supplies, 4111.
- Organic poisons** Cattle poisoned with mercaptophos, 526; diamines and spermatogenesis, 910; action of organic mercury in cattle, 1587; dieldrin in sheep dog, 1940; parathion in fowl, 1944; 2317; oedema disease of chick, 2273; parathion in pig, 2316; toxicity of dieldrin, 2318; metaldehyde in dog, 2319; thiram in fowl, 2707; hexachlorobenzene in man and rat, 2708; book on chemicals in food, 2793; phenol in cat, 3059; aldrin in pig, 3062; chemicals toxic for wildlife, 3068; butylated hydroxyanisole in dog, 3335; aliphatic fluorine poisoning, 3378; urea in cattle, 3382; coumaphos (Co-Ral) in cattle, 3386; carbon tetrachloride in sheep, 3739; the anticoagulants LM 83 and LM 91 in pig, dog and cat, 3743; pentachlorophenol wood preservatives in pig, 3744; phosphoramide in cattle, 3749; warfarin in dog, 4115; sulphaguanoxaline in chick, 4129; organophosphorus in fowl, 4132.
- Plants** *Trichodesma incanum* in horses, 232; *Trichodesma incanum* in cattle, 233; *Heliolebor purpureus* and leucocytosis, 234; action of tannic acid on rat, 235-6; toxic substance from sweet potatoes with fungal rot, 237; toxic principle of *Dichapetalum toxicarium*, 527; key to symptoms of plant poisoning, 528; Brazilian plants, 529; *Acacia georginae* in cattle and sheep, 585; *Bersama abyssinica* in cattle, 911; *Crotalaria* species in poultry feed, 912; corn cockle, cocklebur and coffee in poultry feed, 912; ensiled beet pulp in cattle, 1251; *Solanum elaeagnifolium* in cattle, 1252; *Oenanthe aquatica* in cow, 1253; action of *Oenanthe silaifolia* on animals, 1254; *Ammi visnaga* in fowl, 1256; sprouted wheat fed to cattle, 1762; *Cestrum* in cattle, 1914; beet-top silage in cattle, 1947; hepatotoxin of *Myoporum laetum*, 1948; *Hymenoxys* (*Actinea*) *richardsonii* in sheep, 2321; *Datura stramonium* in fowl, 2322; sanguinarine in rabbit, 2709; heliotrope in cattle, 2710; heliotrope alkaloids, 3385; 3746; oak leaves in horse, 2711; *Tribulus* in sheep, 2713; *Canavalia ensiformis* (Jack bean) in cattle, 3060-1; fenugreek in cattle, 3328; fenugreek in sheep, 4121; poisonous plants in Queensland, 3445; toxicity to fowl of hardwood litter, 3381; Brazilian groundnuts, 3384; groundnuts in poultry, 4118; toxic principle in *Acacia georginae*, 3747; *tutu* (*Coriaria arborea*) in sheep and dog, 3748; kale in cattle, 4117; steroid protects dog against digitalis, 4119; bracken in cattle, 4120; lupin alkaloids in rabbit, 2712; lupins in sheep, 4121; lupins in animals, 4123; *Ipomoea asarifolia* in cattle, sheep, goat, 4124-5; *Enterolobium* fruit in cattle, 4126; pyrrolizidine alkaloids in livestock, 4127; pine needles in mice, 4128.
- Therapeutic substances** Diphenylthiocarbazon in dog, 2320; streptomycin in poultry, 2333; penicillin, 1063; 3072; 3393.
- POLAND** Diseases of animals, 2398.
- See also *Brucella* infection, sheep; *Encephalomyelitis*, porcine; *Gastro-enteritis*, porcine; *Lungworms*, cattle.
- POLIOMYELITIS** Neutralizing antibodies in cattle and pig, 744; infection of pig with Col SK virus, 745; antibodies in monkey, 2170.
- POLYBOR** For control of fly larvae in faeces, 799.
- POLYLYSINE** Bacteriostatic action, 1400-1.
- POLYMYXIN** Action on leptospires, 3184.
- PORPHYRIA** In Danish cattle, 2683; acquired from hexachlorobenzene poisoning, 2708.
- PORTUGAL** see *Leptospira* infection, swine; Swine fever, African.
- PORTUGUESE TIMOR** Parasites of animals, 2601.
- POSTHITIS** see Genital system, prepuce.
- POTASSIUM** Photometric analysis, 582; excretion during diuresis in cow, 1618; in blood of horse, 1895; radio-potassium in cow, 2303; in sheep erythrocytes, 2727; in lamb erythrocytes, 2728; high and low blood K in sheep, 2729-30; types in cattle and sheep, 3081; deficiency in dog, 3697.
- POTASSIUM NITRATE** Toxicity for sheep, 1250.
- POX DISEASES**
- General** Histopathology of swine pox, 435; paravaccinia in cattle, 739; vaccine treatment of udder pox, 740; monkey pox, 1105; hybrids of pox viruses, 1106; inclusion bodies in cow pox, 1447; vaccination for goat pox, 1449; tumours in monkey related to a pox virus, 1794; immunizing antigen from rabbit pox virus, 2916; pox in mourning dove, 3583; formaldehyde inactivation of vaccinia virus, 3582; cells infected with vaccinia not stained by cresyl blue, 3950.
- Canary pox** Immunization, 2521; gel diffusion test, 3232.
- Ectromelia** Proliferation of virus, 441; hepatitis in mouse, 2200.
- Fowl pox** Lesions in explants of embryonic skin, 101; rapid histological diagnosis, 2573; live versus dead vaccines, 3228; c.f. test, 3229; technique of vaccination with pigeon pox virus, 3230; re-vaccination, 3231; gel diffusion test, 3232.
- Sheep pox** Simultaneous immunization against pox, anthrax and brucella, 357; culture of virus, 1448; vaccination, 1449; in Sudan, 2519; in Egypt, 2520.
- PREDNISONE** For leucosis in dog, 1888; for mast-cell tumours in dog, 3322; for piglet eczema, 3719.
- PREGNANCY**
- General** Pseudopregnancy in rabbit, 1356; foetal resorption by Malucin given to bitch, ewe and cat, 1633; starvation and early pregnancy in mice, 1634; hormones and myometrial function in ewe, 2015; role of corpus luteum in cow, 2372; 3100; foetal mummification in cow, 2382; the kidney during pregnancy in the cow, 3415; glucose tolerance in cow, 3768; changes in pancreas of pregnant cow, 3776; action of pituitary gonadotrophin on ovary of pregnant cow, 3792; hydroxyprogesterone for pseudopregnancy in bitch, 4196.
- Diagnosis** An immunological test, 283; vaginal biopsy in sheep, 284; in mare, 2760; diamino-oxidase test unsuitable for cow, 2761; in ewe, 3433; BVA handbook, 3790.
- Toxaemia** In ewe, 1270; 3707-9.
- PREGNANT MARES' SERUM** see Sex hormones, gonadotrophins.
- PROCAINE** For diarrhoea in piglet, 2695.
- PROGESTERONE** see Sex hormones.
- PROLACTIN** see Pituitary gland, anterior hormones.
- PROMAZINE** see Tranquillizers.
- PROMINTIC** see Methyridine.
- PROPIONIC ACID** Action on abomasum, 1974.
- PROPRIONYLPROMAZINE** see Tranquillizers.
- PROSTATE GLAND** see Genital system.
- PROSTHOGONIMUS** Life-history of *P. ovatus*, 1847.
- PROTEINS** In urine of calves, 2788.
- See also Blood, chemical composition.
- PROTEUS** Infection in irradiated mice, 2438; properties of the genus, 2437.
- PROTHIDIUM** In trypanosomiasis, 694; 1770; 3920.
- PROTOCOLLEPSIS** see Leeches.
- PROTOSTRONGYLUS** Life cycle of *rufescens*, 2645; *rufescens* in hare in Italy, 3314; brevispiculum in sheep, 4048.
- PSEUDOMONAS** In bovine mastitis, 636; antiserum therapy, 1014; cultures inhibited by sex hormones, 2116; entero-colitis in chinchilla, 2827; extracellular antigens, 2828; generalized infection in cow, 2826; pigmented strains, 3148; non-pigmented strains, 3149; Group H pyocyanea from bull, 3491.
- PSEUDOPREGNANCY** see Pregnancy.
- PSEUDOTUBERCULOSIS** see *Pasteurella pseudotuberculosis*.
- PSITTACOSIS** In wild birds, 135; 1510; in wild and domestic birds, 1717; in duck, 1142-3; 1827-8; antibodies in turkey, 1148; 2480; 2578; c.f. test for turkey, 2209; in fowl and partridge, 1142; in budgerigar and parrot in U.K., 3620; in East Germany, 447; in Canada, 3444; fluorescent antibody method, 790; tissue culture of virus, 1144; antibiotic therapy, 1146; action of pyrimidines on

PSITTACOSIS—[cont'd.]

virus, 1825; pathogenesis, 2203; latent infection of tissue cultures, 2958; freeze-dried virus, 3267.

PSITTACOSIS-LYMPHOGRANULOMA GROUP OF VIRUSES

Pneumonia in cattle, 115; 419-421; 3627; antibodies in sheep sera, 763; virus from bovine abortion, 1122; Miyagawanella bovis in Australia, 1123; bovine encephalomyelitis, 1463; 2533; cell-wall antigens, 2196; group-specific antigens, 2581; c.f. test, 2962; neorickettsia in cattle, 3627; neorickettsia in horse and cattle, 1829; neorickettsia infections, 3628; neorickettsia in Albania, 3629.

PSORERGATES On sheep in Argentina, 802; control, 4015.

PYOMETRIA See Genital system, uterus.

PYRETHRUM For tick control, 2978.

PYRIDOXINE see Vitamin B 6.

PYRROLIZIDINE ALKALOIDS Action on liver, 4116.

See also Heliotropium; Poisoning, plants.

Q FEVER see Rickettsia infection.

QUAILS Bronchitis virus, 789; ulcerative enteritis, 1003; 2059; Japanese quail as lab. animal, 4149.

QUINAPYRAMINE Action on trypanosomes, 86; 1078; for trypanosomiasis in pig, 1418; for trypanosomiasis in camel, 2890.

QUINOSOL see Chinosol.

RABBITS Control in Australia, 1624; 2753; stress syndrome, 2701; enteritis and nutrition, 3339; respiratory disease, 3901; intestinal flora, 3918.

See also Bacterium viscosum equi; Chloramphenicol; Clostridium welchii infection; Digestive system, intestine; Eimeria infection; Escherichia freundii; Infertility; Insemination, artificial; Myxomatosis; Pasteurella pseudotuberculosis; Pregnancy; Ringworm; Salmonella infection, general; Salmonella typhi-murium; Staphylococcus infection.

RABIES

General Transmitted by bats, 97; 413; report of WHO committee on rabies, 407; hyaluronidase-like substance in saliva of carnivores, 409; not found in shrews, 738; symptoms in cattle, 1441; 2163; in dog, cat, fox and raccoon in U.S.A., 1442; in dog and fox in Greenland, 1791; in alpaca, 1443; monograph on recent advances, 2400; histopathology in mammals, 2517; apparent spontaneous recovery of a heifer, 2913; influence of corticotrophin, 2914; pathogenesis, 3581; electroshock treatment, 3949; in jaguar, 4090; in Canada, 1221; in Germany, 406; in Indonesia, 98; in goat and cattle in Slovakia, 1792; in Swaziland, 587; in Trinidad, 97; in U.S.A., 3946; in farm animals in U.S.S.R., 735.

Diagnosis Staining method for Negri bodies, 1793; 2162; gel-diffusion test, 2161; rhodamine B stain, 2911; fluorescent antibody test, 2912; tissue culture method, 3224.

Immunology Blood proteins of dog during immunization, 99; immunity from supernatant fluid of chloroform vaccine, 100; localization of antibody in gamma-globulin, 412; death of cat after vaccination, 591; 3947; vaccine from brain of buffalo calf, 736; immune serum from horse, 1102; tissue culture vaccine, 1103; vaccination of animals in Canada, 1104; transmission of virus hepatitis during rabies vaccination of dog, 1133; immunizing dog, 1445-6; 2164; ultra-violet inactivated vaccine, 2514-6; resistance conferred by distemper, 2518; live versus dead vaccines, 3228; Flury vaccine for cattle and sheep, 3580; duck-embryo propiolactone vaccine, 3948.

Virus Tissue culture, 408; 3226; inactivation by heat and formaldehyde, 410; purified soluble antigen, 411; infective and c.f. antigens, 1444; action of Bacillus subtilis filtrate, 2165; in day-old chick embryo, 2513-5; culture in nerve cells, 2915; 3224; properties of avianized strains, 3225; action of thiomerical and phenylmercuric borate, 3227; unrelated to distemper virus, 3604.

RACCOONS see Distemper; Rabies; Wild animals.

RADIATIONS

General Glossary of atomic terms, 1307; irradiated nematode larvae, 1539-40; 2996; bovine leucosis and radio-activity, 1549; X-irradiation of rat and uptake of Ca and Sr, 1584; action on chick embryo, 1649; 2751; book on low-level irradiation, 1664; lethal doses related to mitotic rate, 1932; calf not protected by bone marrow injections, 1933; X-ray and spermatogenesis in pig, 2296; lethal dose of gamma rays for guinea pig, 211; strontium-90 in diet in U.K., 275; 2748; pathology of horses at Hiroshima, 620; 1233; effects of atom-bomb radiations on mouse, 900; alpha-emitting isotopes in grass, 1234-6; effect on blood of pig, 1237; acute syndrome in dog, 1238; treatment of irradiated dog, 1239; 2297; causes of radiation death, 2298; irradiated foods given to mouse, 2299; irradiated meat given to dog, 2300; Proteus infection in irradiated mouse, 2436; inactivation of helminth eggs by X-rays, 2825; radio-

activity in food, 2746; radio-activity in milk, 2749; ingestion of radio-active deposit by cattle, 2750; irradiation for preparing diagnostic viral antigens, 2917; radiation damage (review), 3049; safety of milk and meat from irradiated cattle, 3051; alpha activity of drinking water, 3373; book on hazards to man, 3375; long-term effects on mice, 4103; sterilization of blowflies, 4006; chemical protectors, 4101; resistance of pig to radiation not inherited, 4102.

Radioactive isotopes Labelled Delnav in cattle, 147; radiocalcium metabolism, 180; 210; 2301-2; magnesium in sheep, 184; 1987; 4078; labelled cyanocobalamin, 193; metabolism of Sr and Ba in cows, 210; 2301-2; isotopic determination of oestrogens, 291; metabolism of Na and P by trypanosomes, 374; alimentary uptake of small labelled particles, 1609; labelled progesterone, 1801; toxin labelled with radi sulphur, 1950; autoradiography of labelled bacilli in mouse, 2046; labelled copper sulphate in pig, 2280; caesium and potassium in cow, 2303; radiocarbon in chick, 2388; radiomagnesium in rat, 2746; deposition of Sr-89 and Sr-90 after reactor accident, 2747; use in veterinary science, 3050; determination of C and P in tissue and blood, 3052; radi sulphur in wool, 3053; 3054; labelled glucose in sheep, 3332; radiocopper in rat, 3344; book on applications in biochemistry, 3455; radiofluorine in cattle, 3379; blood platelets labelled with radi sulphur, 3762; radiophosphorus in bull, 3779; labelled anthrax bacilli, 989; 3134; artificial ova labelled with radiogold, 567; 3788; chromium-labelled erythrocytes, 3566; labelled bacterial toxin, 3695.

See also Iodine; Selenium; Sodium; Strontium; Zinc.

RADIOGRAPHY Mediastinum of dog, 208; 524; gonad shields for dog, 209; of fistulous withers, 481; cerebral angiography in dog, 583; of head of pig, 1917; book on technique, 2035; of limbs of foal, 2743; of chick embryo, 3401; of udder, 3459; skeleton of fowl, 3621; coronary arteries in dog, 3406; barium meal in the chick, 4169; diagnosis of roundworms in fowl, 4053.

RAILLIETINA Bithional treatment, 151.

RAPACODIN see Dihydrocodeine.

RATS German book on rat as lab. animal, 596; ringtail, 897; lack of maternal instinct, 1652; cytomegalic inclusion bodies, 2201; chronic arteritis, 3046; new latent virus, 3604.

See also Digestive system, intestine; Eyes; Leptospira infection; Neoplasms, general; Ringworm; Salivary glands; Salmonella infection; Thymus gland.

REINDEER see Brucella infection; Elaphostrongylus; Enzymes; Moniezia.

REPORTS

Australia Northern Territory Administration, 585; Institute of Medical and Vet. Science, 586; C.S.I.R.O., 1310; Queensland Department of Agriculture, 3445.

Bahamas Agric. and Marine Products Board, 590.

Basutoland Dept. of Agriculture, 588.

Bechuanaland Department of vet. services, 3114.

Belgium Committee for control of sterility, 2769.

Bermuda Director of agriculture, 1313.

British Guiana Director of agriculture, 1312.

Canada Alberta Dept. of Agriculture, 3444.

Federation of Rhodesia and Nyasaland Federal Ministry of Agric., 3446.

France Alfort veterinary school, 1661.

Ireland Veterinary research lab., 3822.

Jamaica Ministry of Agriculture, 2784.

Kenya Veterinary department, 1311; E. African trypanosomiasis research, 2483.

Netherlands Artificial insemination, 944; specimens examined at Utrecht, 3193; livestock health in Drenthe province, 3447; livestock health in South Holland, 3448; livestock health in Friesland, 3823.

New Zealand Animal research division, 2394.

Nigeria West African Institute for Trypanosomiasis, 3919; Northern Region Ministry of Animal Health, 4212; livestock in Western Nigeria, 4213.

North Borneo Dept. of agriculture, 1314.

Norway Veterinary service, 2785.

Nyasaland Dept. of vet. services, 2396.

Sarawak Dept. of agriculture, 1660.

Sierra Leone Veterinary dept., 589.

Swaziland Dept. of vet. services, 587.

Tanganyika Dept. of vet. services, 1659.

Uganda Dept. of vet. services, 2395.

Union of the Soviet Socialist Republics Moscow veterinary academy, 1289; helminthological laboratory, 2255.

United Kingdom Agricultural Research Council, 510; 2783; 3820; Milk Marketing Board, 584; Ministry of Health, 1308; National Inst. for research in dairying, 1309; National survey of disease and husbandry in dairy herds, 1574; Colonial animal health research, 2393; committee on toxic chemicals, 3066; Animal Health Trust, 3821; Animal Health Services, 4209; West of Scotland Agric. College, 4210; Northern Ireland Ministry of Agriculture, 4211.

REPORTS—[cont'd.]

United States of America New York State Dept. of Health, 591; New York State Veterinary College, 3824; Florida agricultural experiment station, 3825.

Viet-Nam Pasteur institute, 978.

Zanzibar Dept. of Agriculture, 4214.

RESERPINE see Tranquillizers.

RESPIRATORY SYSTEM

General Anatomy in fowl, duck, pigeon, 939; electron microscopy of chick lung, 1621; factors affecting respiration in sheep, 3075; respiratory function in dog, cat and lab. animals, 4171.

Diseases Virus pneumonia in cattle, 115; 419-421; 3627; 3960; chronic interstitial pneumonia in cattle, 512-3; infectious rhinotracheitis of cattle, 514; hyaline membrane pneumonia in calf, 886; mycotic pneumonia in calf, 1060; pseudomembranous coryza in cattle, 1226; bronchopneumonia in cattle, 1913; bronchopneumonia in lamb, 516; antibiotic aerosol therapy for pig, 538; role of vitamin A and pasteurella in pig, 1010; endemic pneumonia in pig, 1790; Haemophilus pneumonia in pig, 2066; 3152; lung oedema in pig, 2694; parasitic hepatitis and pneumonia in pig, 3316; horse better than dog for emphysema experiments, 3410; pulmonary adenomatosis in horse, 3714; influenza and resistance of mouse to bacteria, 3951; pulmonary emphysema in dog, 212; pneumocystis pneumonia in dog, 715; mediastinal blastomycosis in dog, 1064; uraemic pneumonia in dog, 1927; asthma in cat, 1230; rhino-conjunctivitis in cat, 1816; pneumonia in fowl, 1931; emphysema in rabbit, 523; chronic infection in rabbit, 3901; Haemophilus pneumonia in guinea-pig, 2435; pneumonia in germ-free guinea-pig, 3045.

Lungs Cancer in horse, 484; primary neoplasms in dog, 485; cholesterol deposits in cat and rodents, 903; cancer in dog, 2258; adenomatosis in cattle, 1061; papilloma in goat, 2262; histology of bronchial epithelium in cow, 1279; classification of lung anatomy in animals, 3410; diameter of lung capillaries in dog, 4161.

Nose Mycotic granuloma in cattle, 1062; bacterial rhinitis in cat, 2109; viruses and PPLO in pig, 2191; nasal neoplasms in sheep, 2259.

RESTRAINT OF ANIMALS Bulbocapnine for cattle and cat, 243; immobilization of wild animals, 1595; 3108.

RETICULO-ENDOTHELIAL SYSTEM Neoplasms in animals, 164; phagocytic activity, 1272; 4162.

REVERIN see Tetracycline.

RHINITIS see Respiratory system, nose.

RHINITIS, PORCINE ATROPHIC Seasonal incidence, 517; Dutch studies, 889; 890; histology of parenchymatous organs, 1228; X-ray diagnosis, 1917; Russian studies, 1918-21; 2294; in Czechoslovakia, 2693; commoner in gilt than sow, 3039; antibiotic therapy, 3040; diagnostic allergen, 3041; IBR in Belgium, 3254; control in Ontario, 3364; histology, 3718.

RHINOPNEUMONITIS, EQUINE VIRUS see Abortion, equine virus.

RHINO-TONSILLITIS, CANINE CONTAGIOUS The virus, 1491; clinical features, 3260.

RHINOTRACHEITIS, BOVINE INFECTIOUS In Yugoslavia, 514; conjunctival form, 1467; virus isolated in Germany, 1468-9; 2177; virus related to enterovirus, 1119; in Canada, 2928; 3241; conjunctivitis in calf, 2929; electron microscopy of virus, 3242; action of virus on new-born calf, 3591; vaccines, 3959.

RHINOTRACHEITIS, FELINE INFECTIOUS Properties of virus, 778; 1816.

RHIPICEPHALUS see Ticks.

RHODESIA & NYASALAND, FEDERATION OF see Reports.

RHODOTORULA Mastitis in a mare, 359; cholangitis in a pig, 2465.

RIBONUCLEIC ACID Of foot and mouth virus, 1099; of Newcastle disease virus, 1822; three types of acid, 3633; DNA in bull semen, 4175; treatment of cock semen with DNA, 4189.

RICKETS see Bones.

RICKETTSIA INFECTION

General Ovine contagious ophthalmia, 2585; rickettsia in Argas persicus, 3269.

Q fever Diagnosis in fowl and pigeon, 137; rapid slide agglutination test, 455; infectivity of meat, 456; in veterinary students, 1377; in wild birds, 1510; in horse and cattle, 1829; oral infection of sheep, 2217; in cattle in Germany, 1830; in cattle in U.S.A., 2218; 3998; in cattle in Nyasaland, 2396; in cattle in Belgium, 2582; tissue culture, 2583; in tortoise and in Hyalomma ticks, 2584; in Canada, 3444; in Albania, 3629; in Australia, 3630.

RIFT VALLEY FEVER In rodents, 2171; antibodies in cattle, sheep and goat, 2918.

RINDERPEST Cross-immunity with distemper, 131; 450; 773; 1116; 3972; absence of haemagglutinin, 111; in Impala, 755; intradermal allergic reaction, 760; immunization in Viet-Nam, 757; in Ethiopia, 758; gel diffusion test on

lymph node biopsy samples, 1114; gel diffusion studies of virus, 1115; rapid c.f. test, 1459; c.f. test, 2923; immunization of game animals, 1460; response of rabbit to lapinized virus, 1461; growth rate of vaccinated calf, 2176; in Uganda, 2395; gel diffusion test, 2534; propagation in embryonated eggs, 2924; goat vaccine in Sudan, 3240; production of goat vaccine, 3588.

RINGWORM Griseofulvin treatment of dog and cat, 669; 1758; 3056; 3907; growth of dermatophytes on soil, 670; in hedgehog, 671; Trichophyton infection in chinchilla, 1069; 3543; 3908; mouse favas, 1070; man infected from guinea-pig, 1759; treatment of mouse, 1764; Trichophyton in sheep, 2123; treatment of calf with 2,4-D, 2124; fungi in soil, 2467; treatment of horse with iturine and chinosol, 2884; Keratinomyces in horse, 2885; T. mentagrophytes in rabbit, 3197; M. canis isolated from air, 3198; Trichophyton equinum in horse, 3542; in lab. rat, 3905; trichophytin diagnostic antigen, 3904; seasonal variation in incidence in dog and cat, 3906.

RONNEL (fenchlorphos) see Anthelmintics; Parasiticides.

ROUND HEART DISEASE In duckling, 2295.

ROUS SARCOMA see Neoplasms, fowl and turkey.

RUELENE see Anthelmintics; Parasiticides.

RUMEN see Digestive System, ruminant digestion.

RUNT DISEASE see Immunology, general.

SABLE (Mustella) see Listeria monocytogenes infection.

SALIVARY GLANDS Climate and salivation in buffalo, 248; hyaluronidase-like substance in saliva of carnivores, 409; salivation in sheep and camel, 1605; 1606; 1607; viral inclusions in gerbils, 2700; sialoadenitis in rat, 2703; virus infections in mouse, 3610.

SALMONELLA GROUP Sugars in O antigens, 47-8; method for preparing endotoxins, 49; in feedstuffs, 51; 2076; 3157-8; 1027; in fertilizers, 1027; in fish meal, 337; 3501; rare types imported with feathers, 62; types isolated in U.K., 640; 3500; culture media, 46; 1022; 2079; S. ngozi, 1023; preparation of active fractions, 2081; occurrence in abattoirs, 2083; drug sensitivity of salmonella, 1360; resistance to chloramphenicol and tetracyclines, 3498; in deep-frozen kangaroo meat, 3499; in meat, fish and bone meals, 3877; isolation from faeces, 3873.

SALMONELLA INFECTION

General In rat, 336; in slaughtered rabbit, 1024; in dolphin, 1575; S. bredeney in cat, 1713; transmission by flies, 1714; in animals in Germany, 2076; S. enteritidis in monkey, 2078; immunization of fox, 2838; in nutria, 3161; in tortoise, 3497; man infected with S. saint-paul from meat, 3500; immunization of mice with avirulent typhi-murium, 3876; growth of S. enteritidis in phagocytes, 3875; in cattle, dog, cat, elephant in Indonesia, 3872; maternal transfer of antibodies, 3874.

Birds S. pullorum in a lark, 338; S. thompson from broilers, 339; S. anatum in chukar partridge, 641; polyvalent indirect haemagglutination test, 1025; infected hens' eggs, 1027; 2084; in seagull, 53; 337; S. dublin in pigeon, 1361; S. harrisonburg in hen, 1362; typhi-murium in fowl, 2441; monteideo in fowl, 2841; in fowl, turkey and goose in Finland, 2841; incidence in slaughtered fowl, 2842; latex agglutination test on turkey, 2843; typhi-murium in sparrow, 3159; weltevreden and dublin in chick, 3502; types isolated in Venice, 3503; source of human infection, 55; 3504.

See also Salmonella gallinarum infection; Salmonella pullorum infection.

Cattle S. typhi-murium infection, 331; 2837; in Costa Rica, 332; not isolated from Italian slaughter cattle, 334; S. dublin in calf, 358; dublin in cow, 3156; cholerae-suis transmitted by drinking water, 1998; abortion in cow, 658; 2113; bacteriological diagnosis in calves fed antibiotic, 2120; paratyphi B infection, 1709; 3495; brain lesions in calf, 3536.

Dog Intestinal flora, 50; infection from horse meat, 333; S. ngozi, 1023; eight cases, 1713.

Horse Salmonella from horse meat, 333; abortus-equi and orchitis in Egypt, 1058; incidence at slaughter, 1988; typhi-murium in foal, 2836.

Sheep Typhi-murium transmitted by drinking water, 1998; anatum infection, 2440.

Swine General account, 3160; senftenberg infection, 334; in liver and spleen of healthy pig, 335; in mesenteric lymph nodes, 334; 1711; abattoir survey in Spain, 3496; salmonella infection during swine fever, 1482; carrier state, 1710; experimental infection from fish and bone meal, 1712; nitrofurazone for cholerae-suis infection, 2077; anatum infection, 2440; paratyphi B infection, 3495; saint-paul infection, 2500.

SALMONELLA ABORTUS-EQUI see Salmonella infection, horses.

SALMONELLA ANATUM see Salmonella infection, birds.

SALMONELLA CHOLERAЕ-SUIS see Salmonella infection, cattle, swine.

SALMONELLA DUBLIN see Salmonella infection, birds, cattle.

SALMONELLA ENTERITIDIS see *Salmonella* infection, general.

SALMONELLA GALLINARUM INFECTION (FOWL TYPHOID) In Denmark, 2441; concurrent with fowl paralysis, 2443; chlortetracycline treatment, 3071; influence of diet, 3165; in Greece, 3370.

SALMONELLA PULLORUM INFECTION In Denmark, 2441; in Germany, 3034; Type II in the Netherlands, 2082; in lark, mink, nutria and hare, 333; bactericidal action of egg, 54; furazolidone and agglutinins, 1026; absorption of antibody by gut, 1147; frequency of serositis, 1363; action of lysozyme, 1716; antibiotic treatment of carriers, 2442; type intermedius A, 2840; agglutination test on electrophoresed serum, 3163; breeding resistant fowl, 3164; antigens for agglutination test, 3166.

SALMONELLA TYPHI-MURIUM In cattle, 331; 2837; in pigeon, 1361; in rabbit, 1024; 3162; resistant strain from fowl fed chlortetracycline, 1288; lysogeny, 1715; cultivation, 2080; in abattoirs, 2083; in hens' eggs, 2084; phage-typing, 2439; in foal, 2836; human infection from calf, 2837; in goose, 2841; in nutria, 3161; in guinea-pig and canary, 3193; immunity from avirulent strain, 3876.

SANGUINARINE In milk of rabbit, 2709.

SAPONINS In lucerne, 2659; 3015; 3328; saponins promote growth, 4068.

SARAWAK see Reports.

SARCOGYSTIS In sheep, 3214.

SARCOPTES see Mange.

SAUDI ARABIA Diseases of animals, 3031.

SCHISTOSOMA Life cycle of *S. incognitum*, 814; *S. bovis* in cattle, camel, goat, donkey in Somalia, 1163; no schistosomes in Turkish cattle, sheep, goat, 1531; hybrid of haematobium and matthei, 2236; in baboon, 2237; 3644; in cattle in Southern Rhodesia, 2612; lesions caused by japonicum ova, 3300.

SCOPULARIOPSIS Mycotic dermatitis in cattle, 1219.

SCRAPIE In Canada, 1221; recent experiments, 1223; similarity to kuru in man, 1245; histology of nerve ganglia and adrenals in sheep, 1802; in U.S.A., 2181; glycogen and copper in brain, 2182; spontaneous in goat, 2934; oral and intracerebral infection of sheep and goat, 2935; reproduction in mice, 2936.

SELENIUM Prevents haemorrhagic syndrome in chick and poult, 188; 1907; role in animal health, 189; Se-75 in dog hair, 899; toxicity of sodium selenite for pig, 908; toxicity of sodium selenite for cattle, 1211; role in ill-thrift of calf, 1896; poisoning in mouse, 2705; treatment of white muscle disease in lamb, 3350; serum and tissue residues in sheep, 3389; sodium selenate for muscular dystrophy, 4077.

SEMEN & SPERMATOZOA

General Frequency of ejaculation of bull, 945; action of acridine orange, 1630; haemolysis in bull semen, 1631; fate of oviduct of ewe, 2008; fatty acids in semen, 2741; composition of successive ejaculates from bull, 2759; resistance to cold shock, 4187; DNA in relation to fertility, 4175; treatment of cock semen with DNA, 4189.

Bacterial content *Trichomonas foetus*, 87; bacteria in ram semen, 1736-7; 2855; leptospirae in bull semen, 2098; antibiotics for turkey semen, 2132; *C. pyogenes* in bull, 3481.

Diluents and additives Complan in diluted bull semen, 566; egg yolk and tomato juice, 947; diluents for ram semen, 1632; 3096; whole-egg diluents for buffalo semen, 3418; duck egg-yolk and coconut-water diluent, 3419.

Metabolism Glycolytic and reducing activities of ram semen, 278; oxygen uptake by cock semen, 279; metabolism of boar semen, 2370; effect of blood on bull semen, 3420; hyaluronidase activity in bull semen, 3800.

Morphology X and Y spermatozoa, 280-2; morphology and fertilizing capacity, 946; degenerative forms in epididymis, 3097; electron microscopy of bull sperms, 3411; apical body in bulls, 4188.

Preservation Factors aiding deep-freezing, 1291; freezing ram semen, 3095.

SENEGIO Seneciophylline in fowls, 1255.

SEROSITIS, PORCINE INFECTION see Glaesser's disease.

SEVIN see Parasiticide.

SEWAGE Transmission of helminths to cattle, 161.

SEX Freemartins and placental anastomosis in sheep, 574; change of sex from ovarian tumour in hen, 846; sex drive in bull, 1629; drumstick appendages to neutrophiles in animals, 1970; chromatid in cat, 2356; influence on helminth infestation, 3000; corticotrophin and sex ratio of rat, 3803; sex and bacterial infections, 3900.

SEX HORMONES

General Symposium on sex hormones in vet. medicine, 299; androgens in cow dung, 2375.

Gonadotrophins Formation of anti-gonadotrophins in sheep, 290; action of PMS on ewes, 1299; 3430; assay of gonadotrophins, 1635; 2379; 3431; superovulation in sheep, 1637; induced ovulation in fowl, 3102; PMS and twinning in cattle, 3440.

See also Pituitary gland, anterior hormones.

Oestrogens Diethylstilboestrol and growth of cockerels, 177; determination of oestrone and oestradiol in plasma, 291; stilboestrol caused ovary tumours in dog, 488; in food for pig, 863; effect on sensitivity of uterus to infection, 953; inactivation by bovine liver, 954; effect on ovary function in cow, 955; in clover, 1891; 3429; in kale, 1298; in lucerne, 1295-7; in plants, 2391; 2770; atrophying effect on skin of dog, 1300; in urine of stallion, 1636; hexoestrol for beef steers, 1647; direct action on rat ovary, 2016; action on cultures of mastitis bacteria, 2116; in pregnant mare's urine, 2371; action of diethylstilboestrol on heifers, 2374; persistence of hexoestrol in soil and plants, 2389; 2390; treatment of perianal tumours in dog, 2656; effects on plasma proteins in hen, 2734; absorption of hexoestrol from ear in sheep, 2766; in ovary of mare, 3427; inhibit blood formation, 3763; for unthrifty calf, 3791; diethylstilboestrol implanted into bull, 3793; effect on ovine vagina, 3794; seasonal changes in response of ewe, 3795; prolonged application to skin, 3799; clover and reproduction in sheep, 4194; anisylchloroethylene as pro-oestrogen, 4195.

Progesterone Blood content at parturition, 288; enhanced fertility in cow, 293; induced oestrus in ewe, 569; metabolism in cat, 1301; blood levels in sheep, 1638; effect on bovine fertility, 2014; action on ovine uterus, 2015; in pregnant cow, 2372; synchronized oestrus in cow, 2764; suppression of oestrus in sheep, 2765; action on ovary of pregnant cow, 3100; effect on ovine vagina, 3794; for infertility in cow and sow, 3796; action on myometrium of rabbit, 3798; induced oestrus in sheep, 4193; acetoxyprogesterone delays oestrus in bitch, 957; action of hydroxyprogesterone in bitch, 4196.

Testosterone For infertile bull, 1640; action on bull, 3101.

SHEATH ROT see Genital system, prepuce.

SHEEP

General Sheep biology laboratory in Australia, 1625; selective grazing, 1646; book on sheep husbandry and diseases, 3832.

See also Pregnancy, diagnosis.

Arthropod parasites see Blowflies; Lice; Oestridae, Oestrus; Psorergates; Ticks; Wohlfartia.

Bacterial and fungal diseases see *Actinobacillus*; *Aspergillus* infection; *Candida* infection; *Clostridium welchii* infection; *Escherichia coli* infection; *Histoplasma capsulatum*; *Listeria* infection; *Listeria monocytogenes* infection; *Mastitis*, ovine; *Mycobacterium johnei* infection; *Pasteurella haemolytica*; *Pluropneumonia-like* organisms; *Ringworm*; *Staphylococcus* infection; *Vibrio fetus*.

Diseases, general Symposium on sheep diseases, 1223; sudden death, 1223; cerebrocortical necrosis, 1243-4; bacterial icterus, 1756; diseases in Saudi Arabia, 3031; diseases in East Germany, 3362.

See also Bones, diseases; Encephalomalacia; Facial eczema; Foot rot; Genital system; Heredity; Ketosis; Leucosis; Neoplasms; Pancreas; Skin, diseases; Sway-back; Teeth; Urinary system, diseases.

Helminth parasites see Helminth parasites.

Nutrition and nutritional disorders see Nutrition.

Physiology see Adrenal gland; Amino acids; Blood; Climate; Digestive system; Genital system; Glucose; Ketone bodies; Kidneys, general; Respiratory system, general; Magnesium; Metabolism; Nervous system; Pancreas; Phosphorus; Pituitary gland, anterior hormones; Pregnancy; Salivary glands; Semen and spermatozoa; Skin; Sodium; Temperature, environmental; Thyroid gland; Transplantation of tissues; Vitamin D; Water metabolism.

Protozoan diseases see Eimeria; Eperythrozoon; Sarcocystis; Toxoplasma infection; Trypanosoma infection.

Virus and rickettsial diseases see Abortion, ovine; Aujeszky's disease; Ethyma, contagious; Encephalitis, Japanese; Encephalitis, tick-borne; Louping-ill; Pox diseases; Psittacosis-lymphogranuloma group; Rabies; Rickettsia infection; Scrapie; Visna; Wesselsbron virus.

Youngstock Causes of bronchopneumonia, 516; metabolism, 940; cyclopiation malformation, 963; fatty acid metabolism in relation to survival, 1965; rickets, 3023; congenital myopathy, 3105.

See also Blood, chemical composition; Digestive system, intestine; Iron; Muscular Dystrophy; Temperature, body; Thyroid gland, diseases.

SHEEP POX see Pox diseases.

SHIGELLA Enteritis in duckling, 2835; flexneri in cattle and pig, 3155.

SHIGELLA EQUIRULUS see *Bacterium viscosum* equi.

SHIPPING FEVER In calves sprayed with insecticide, 2596; and oesophagitis, 2658; transmission experiments on calf, 2825; in sow, 3366; virus isolated from calf, 2587; role of virus, 3961.

SIERRA LEONE see *Pfeifferella mallei* infection; Reports.

- SILAGE** Effect on resistance to mastitis, 10; *Listeria* infection from silage, 658; 1346; survival of worm eggs, 3308.
- SIMULIUM** Effect on livestock, 482.
- SINUSITIS, AVIAN INFECTIOUS** In duckling, 448; role of PPLO, 689-690.
- SIPHONA** Repellants, 1156; control by coumaphos, 3597.
- SKIN**
General Sweat gland morphology in cattle, 926; structure in African cattle, 1264; cyclic changes in cattle, 1598; prenatal development in cattle, 1599; coat characters in cattle, 1645; evaporation from skin of zebu, 2076; neck appendages in goat, 1961; wool follicles and skin thickness in sheep, 2724; sweat glands in sheep, 3077; skin of dog, 1600; lipids of dog skin, 3783; method for studying bacterial flora, 2802; chemical depilation, 3817.
 See also Hair.
- Diseases** Melanoma in cow, 838; lucerne eruption in cattle, 853; lesions in *Theileria annulata* infection, 1424; mycotic dermatitis in cattle, 2129; staphylococcal infection in cattle, 2648; infectious impetigo in piglet, 4; pox-like eczema in pig, 435; dermatosis vegetans in pig, 2020; papular dermatitis in pig, 2125; prednisolone for piglet eczema, 3719; Vitiligo in cattle, 206; 3376; dermal cysts in sheep, 2723; Keratinomyces infection in horse, 2885; fetlock eczema in horse, 3715; skin disease in dog cured by rabies vaccine, 737; neoplasms in dog, 1193; atrophy from stilboestrol in dog, 1300; skin disease in dog and cat, 2698; vesicular dermatitis in fowl, 1256; corynebacterial ulcers in monkey, 1340; transmissible cutaneous tumor in hare, 1494; skin disease in veterinarian, 3377.
- SKUNKS** see Wild animals.
- SLAUGHTER OF ANIMALS** Changes in blood bicarbonate after stunning, 929; carbon dioxide for slaughter of chicken, 3106; pentobarbitone for quietening broilers, 3107; utilization of by-products in underdeveloped countries, 4205.
- SNAKES** see Wild animals.
- SODIUM** Photometric analysis, 582; selective appetite in sheep, 1210; 2673; action of radiosodium on rats, 1588; excretion during diuresis in cow, 1618; depletion and adrenal cortex of sheep, 2380; in sheep erythrocytes, 2727; in lamb erythrocytes, 2728; types in cattle and sheep, 3081; deficiency in pig, 3698; deficiency in sheep, 3699.
- SODIUM CHLORIDE** Salty food and blood cholesterol in rat and dog, 500; action on kidney function in sheep, 3700; action of i/v injection on bovine rumen, 4163.
- SODIUM FLUORIDE** see Anthelmintics; Fluorine.
- SODIUM PENTACHLOROPHENATE** see Molluscs.
- SOIL** Disinfection, 162; survival of *Listeria*, 627; 1345; detection of tubercle bacilli, 620; growth of dermatophytes, 670; ecology of coll-aerogenes bacteria, 2073; persistence of hexoestrol, 2389; 2390; pathogenic fungi in soil, 2467; 2469; 2470.
- SOLANUM** see Poisoning, plants.
- SOMALIA** see *Leptospira* infection; Schistosoma.
- SOSULIKS** see Toxoplasma infection.
- SOUTH AFRICA, REPUBLIC OF** see *Brucella* infection; *Clostridium welchii* infection; *Mycobacterium tuberculosis* infection, swine.
- SOUTHERN RHODESIA** see Oedema disease of pigs; *Pasteurella haemolytica*; *Schistosoma*.
- SOYA BEAN** Action on rats, 496; soya bean oil in tympanites, 855; 1202.
- SPAIN** see Chronic respiratory disease; *Candida* infection; *Eimeria* infection; *Salmonella* infection, swine; Swine fever, African.
- SPARROW** see *Salmonella* infection, birds.
- SPINAL CORD** see Nervous system.
- SPIRAMYCIN** For PPLO in fowl, 688; for bovine pleuropneumonia, 1074.
- SPIROGERCA** In dog in Nyassaland, 163; cause of Marie's disease in dog, 2252.
- SPIROCHAETOSIS, AVIAN** see *Borrelia anserina* infection.
- SPLEEN** Lesions in swine fever, 118; thrombosis of trabecular veins in horse, 751; tumours in cat, 843; chemical splenectomy, 977; siderin in horse, 1113; changes in brucellosis, 1728; neoplasms in dog, 1885; lesions in anthrax, 2419; biopsy in horse, 2921; lesions in ovine brucellosis, 3172; immunological properties after freezing, 3555.
- SPONDYLITIS** see Vertebral column.
- SPORIDESMIUM BAKERI** see *Pithomyces*.
- SPOROTRICHUM** Fluorescent antibody method for diagnosis, 673.
- SQUIRRELS** see Wild animals.
- STACHYBOTRYS** Poisoning in horse and zoo animals, 363; poisoning in cow, 3551.
- STAPHYLOCOCCI** Study of mastitis strains, 1; 2; 981; phage-typing mastitis strains, 2410; 2411; 2800; 3458; 3838-9; phage-typing animal strains, 3123; antibiotic resistance of strains from vet. surgeons, 5; from healthy udders, 300; of animal origin classified, 603; sensitivity to antibiotics, 303; detection of agglutinin in serum, 604; anti-staphylococcal activity of serum, 608-9; purified coagulase, 607; coagulase and virulence, 608; 1674; desiccation and virulence, 984; fate within leucocytes, 1321; titration of beta toxin, 1671; action of combinations of antibiotics, 1672; sensitivity and typing of bovine strains, 2040; cultures inhibited by sex hormones, 2116; on nozzles of tubes of antibiotics, 2413; selective medium, 2803; production of penicillinase, 3461; aureus in horse, ox, dog, cat, 3833.
- STAPHYLOCOCCUS INFECTION** Bovine mastitis, 1; 2; 981; 1320; 2040; 2410-1; 2800; 3122; 3840; antitoxin in whey of cows, 3; vaccine for bovine mastitis, 301; 1319; mastitis in sheep, 302; 1325; 2115; 3143; skin disease in piglet, 4; influence of bowel flora on infection in mice, 304; cause of death in infected mice, 983; efficacy of antibiotic therapy, 985; gamma globulin therapy, 986; enhancement by streptococcal toxins, 987; vaccines tried on rabbit, 2041; transmission from cattle to man, 2797; mastitis in goat, 2798; immunization of goat, 2799; optimum time for starting chemotherapy, 2801; pathogenesis, 3124-7; effect of fasting and cortisone on susceptibility of mice, 3123; skin disease in veterinary students, 3834; antibodies in healthy rabbit, 3836; in fowl, 3837; synovitis in turkey, 3838; otitis in pig, 3842; antibacterial factor in human serum, 1673; anti-staphylococcal in animal sera, 3843; influenza and resistance to infection, 3951.
- STATISTICS** Survey of livestock diseases in Northern Ireland, 509; economics of animal health, 880; animal population and production in U.S.S.R., 1306; disease survey in British dairy cattle, 1574.
- STAPHYLOFILARIA** Skin lesions in cattle, 2648.
- STEPHANURUS** Diagnosis by gel-diffusion test, 830; in pigs, 2290.
- STERILITY** see Infertility.
- STEROIDS** Adrenal steroids and growth of cockerel, 177; corticosteroid therapy in horse and ox, 921; corticosteroids and *Pasteurella* abscesses in g.pig, 1012; triamcinolone for asthma in cat, 1230; plasma corticosteroids after corticotrophin injection in cow, 1283; androgens in cow urine, 1294; treatment of virus infections in dog, 2104; hydrocortisone therapy in Newcastle disease, 2567; steroids in follicular fluid of mare, 2763; steroid therapy for endotoxin shock, 3154.
- STIBOPHEN** For staphylococcal infection in cattle, 2648.
- STILESIA** In sheep, 3446.
- STOMATITIS** see Digestive system, mouth.
- STOMATITIS, BOVINE VIRUS** In Yugoslavia, 416; in Australia, 3589; papular stomatitis in U.S.A., 760; in Germany, 3590.
- STOMATITIS, VESICULAR** C.f. test, 112; 759; electron microscopy of virus, 2910.
- STOMOXYS** Transmits equine orchitis, 1088; repellents, 1158.
- STRANGLES** see *Streptococcus equi* infection.
- STREPTOCARA** Fresh-water shrimps as intermediate host, 1182.
- STREPTOCOCCI** Differentiation of mastitis strains, 7; yellow variant of *Str. bovis* from rumen, 12; enterococci in pigs, 13; non-specific R antigen of agalactiae, 1676; cultures inhibited by sex hormones, 2116; classification of animal strains, 2043; Group L from necrotic pig muscles, 3131; resistance to streptomycin, 3192; Groups R and S from pig, 3193; antigens, 3465.
- STREPTOCOCCUS INFECTION** In lab. mouse, 11; Group D from horse with endocarditis, 305; toxins of mastitis streptococci enhance staphylococcus infection, 987; bovine granular vaginitis, 988; brain infection in pig, 1326; vaginitis and orchitis in cattle, 1677; septicæmia in alpaca, 2042; zoepidemicus in fowl, 2414; zoepidemicus in guinea-pig, 2415; susceptibility of mouse, 2416; anti-streptolysin in animal sera, 3843.
- STREPTOCOCCUS EQUI INFECTION (STRANGLES)** Survey of cases, 3130.
- STREPTOCOCCUS PNEUMONIAE** Immunity in mouse, 3466; brain lesions in calf, 3536.
- STREPTOMYCIN** Fatal shock in parrot, 1063; in milk of injected cow, 1955; added to turkey semen, 2132; toxicity for fowl, pheasant, pigeon, 2335; resistant bacteria from animals, 3192; action on *Brucella*, 3886.
- STREPTOTHRICOSIS** see Dermatophilus.
- STRESS SYNDROME** Hydræmia in cattle, 1290; stress in rabbit, 2701; corticotrophin therapy in pig, 4096.
- STRONGYLOIDES** Infection of calf, 154; *S. papillosus* in lamb, 821; malathion for *S. ransoni* in pig, 1536; survival of larvae of papillosus, 2618.
- STRONGYLUS** Resistance to phenothiazine, 4028; anthelmintic combination, 4030.
- STRONTIUM** Metabolism in cow, 210; in human diet in U.K., 275; 2748; effect of X-irradiation in intestinal uptake, 1584; Sr-90 in sheep foetus, 1934; metabolism in domestic mammals and birds, 2731; metabolism of radiostrontium in goat and fowl, 2732; deposition on farm land after reactor accident, 2747; in cattle grazing radio-active pastures, 2750; strontium-90 in bone and foetus of Swedish

STRONTIUM—[cont'd.]

sheep, 3372; metabolism in fowl, 3374; in skeleton of sheep, 4104.

SUCCINYLCHOLINE see Suxamethonium.**SUDAN REPUBLIC**

see Bluetongue; *Brucella* infection, cattle; *Histoplasma farciminosum* infection; *Nocardia*; *Pluropneumonia*, Bovine; Pox diseases, sheep pox; Rinderpest; *Trypanosoma* infection, general; *Trypanosoma equiperdum* infection.

SUGARS Lactose in cow urine, 204; feeding lactose to sheep, 1560; blood sugar in calf, 3767.**SUPLYUK DISEASE OF HORSE** Role of *Trichodesma*, 231;

231-2; similar disease in cow, 233.

SULPHONAMIDES Conjugation with serum protein, 240; sulphaminoxaline for goat, 377; vet. uses of sulphaphenazole and sulphachloropyridazine, 532; best dosage and route for sulphadiazine in cattle, calf and pig, 533-4; sulphadiazine in bovine coccidiosis, 1422; coccidiostats compounds, 1774; 2490; sulphaminoxaline toxic for chick, 4129.

SULPHUR see Wool.

SURAMIN Action on trypanosomes, 1078; lowers resistance of mice to John's disease, 2820; resistant trypanosomes, 2890; ethidium complex, 2889.

SURGERY

General Sterilization of ram, 1304; udder transplantation in goat, 1602; thymectomy in rat, 2026; German book on vet. surgery, 3037; Caesarian section in sow, 2735; chemical depilation, 3817; plastic window for observation of viscera, 3483; hysterectomy in goat, 3819.

Cattle Thymectomy, 1234; abomasal dilatation, 2687-8.

Dog Book on orthopaedic surgery of dog and cat, 598; obstetrical surgery, 298; cataract operation, 1929.

SUXAMETHONIUM Action on horse, 2717; for immobilizing wild animals, 1595; 3108.

SWAYBACK In Scotland, 1563; pathology, 3343.

SWAZILAND see Reports.

SWEAT GLANDS see Skin.

SWEATING In cattle, 926.

SWEDEN Pig health service, 432; copper deficiency in cattle, 1562; milk fever, 2682.

SWINE

General Pig health service in Sweden, 432; piggery ventilation, 564; pathogen-free pig, 965; survey of management in U.K., 3441; sex and survival, 3802; effects of rail transport, 2722; health service Netherlands, 3823.

Anatomy see Genital system, general, ovary, testicle; Pituitary gland.

Arthropod parasites see Mange.

Bacterial and fungal diseases see Actinomyces infection; *Aspergillus*; *Bacterium viscosum* equi; *Bacillus anthracis* infection; *Bacteroides*; *Clostridia*, general; *Clostridium welchii* infection; *Corynebacteria*; *Erysipelothrix rhusiopathiae* infection; *Fungi*, diseases; *Haemophilus*; *Histoplasma capsulatum*; *Leptospira* infection; *Mycobacterium tuberculosis* infection; *Pasteurella* infection; *Pfeifferella whitmori*; *Rhodotorula*; *Salmonella* infection; *Streptococcus* infection; *Vibrio* infection.

Diseases, general Lesions in pituitary and adrenals, 518; subserous hyperplasia of lymphatic tissue, 2308; multiple abscesses, 2312; lung oedema, 2694; book on pig diseases, 3117; diseases in Germany, 3032-3; losses during progeny testing, 3363; shock-like and rheumatoid diseases, 3721.

See also Bones, diseases; Circulatory system; Digestive system; Dysgalactia; Eyes; Joints; Ketosis; Kidneys, diseases; Leucosis; Liver, diseases; Lymphatic system, lymph nodes; Mastitis; Muscular system; Neoplasms; Pancreas; Paralysis; Parturition; Poisoning, organic poisons; Respiratory system; Skin, diseases; Syncope, fatal.

Helminth parasites see Helminth parasites.

Nutrition and nutritional disorders see Nutrition.

Physiology see Blood; Cholesterol; Digestive system, stomach; Metabolism; Milk, composition; Semen and spermatozoa; Thyroid gland.

Protozoan diseases see Balantidium; Eimeria infection; Toxoplasma infection; *Trypanosoma* infection.

Virus and rickettsial diseases Enteroviruses, 125; 771; 1487; 2945; 3258; haemagglutinating virus from brain of piglets, 126; antibodies against myxoviruses, 128; infection with Col SK virus, 745; viruses from nasal cavities, 2191; pneumotropic viruses, 2558; transmissible genital papilloma, 2653.

See also Aujeszky's disease; Encephalitis, Japanese; Encephalomyelitis, porcine; Encephalomyocarditis; Exanthema, porcine vesicular; Foot and mouth disease; Gastro-enteritis; Influenza; Pneumonia, Porcine Virus; Poliomyelitis; Pox diseases; Swine fever; Swine Fever, African.

Youngstock Infectious Impetigo, 4; metabolism, 548; 1267; coli diarrhoea, 1704; mycolonia, 2310; intestinal carbohydrases, 2336; diarrhoea, 2695; glucose in um-

bilical blood, 2735; nutrition and weaning, 3337; 3338; tremor, 3367; antibodies in piglet, 3631; haematology, 3696; eczema, 3719; subcutaneous oedema, 3720; response to ammonium chloride, 4069; early weaning, 4186.

SWINE DYSENTERY see *Vibrio* infection.

SWINE FEVER

General Pathogenesis, 117; 3598; control in U.S.S.R., 764; excretion of virus by immunized pig, 767; persistent viraemia in piglet, 1477; role of salmonella, 1482; leucocyte picture, 1803-5.

Diagnosis Gel diffusion test, 426; 2540; atlas of diagnosis, 1663; agglutination complement absorption test, 3247; haemolysin and amylase in pancreas extracts, 3596; diagnosis by virus exaltation phenomenon in tissue culture, 3966-7.

Immunology Nutrition and immunity, 123; the nervous system and immunity, 428; efficacy of crystal violet vaccine, 766; immunity tested by inhalation of virus, 1128; lapinized virus may harm piglets from inoculated sow, 1477; isoagglutination after immunization, 1478; hyperimmunizing pig with lapinized virus, 1480; combined vaccines, 1837; lapinized virus, 120; 1479; 2937; 3249; reactivation of modified virus, 2938; failures of attenuated vaccines, 3250; harmful effects of crystal violet vaccine, 3600.

Pathology Spleen lesions, 118; histology of heart muscle, 119; histopathology, 1127; changes in adrenal glands, 1483; changes in hypothalamus and pituitary, 1484; pathological studies, 3597; gallbladder lesions, 3599.

Virus Tissue culture, 121; 1481; inactivation by nitrogen mustard compounds and triethylenemelamine, 122; passage in new-born rabbit, 427; multiplication of lapinized virus, 765; related to bovine enterovirus, 1808; attenuated field strains in France, 2183; content in blood and organs, 3248.

SWINE FEVER, AFRICAN General account, 769; in Spain and Portugal, 768; 3251; 3601; in wart hogs in Kenya, 2185; diagnosis, 2186; FAO/OIE meeting, 2528; haemadsorption test, 2541; c.f. test, 2542.

SWINE INFLUENZA see Influenza.

SWITZERLAND see Fasciola; *Mycobacterium tuberculosis* infection; Rhinopneumonitis, equine.

SYNCOPE, FATAL OF SWINE Ca and Mg in heart muscle, 891; 1923; pathogenesis, 1922; associated with sodium deficiency, 3698.

SYNGAMUS Survival in faeces and soil, 1772.

SYNOVITIS see Joints.

SYNOVITIS, AVIAN INFECTIOUS PPLO isolated, 2479; staphylococcal synovitis in turkeys, 3938; egg transmission, 3990; antibiotic treatment, 4136.

TAENIA Cysticercoid in cattle, 152; 2239; 4021-2; diagnosis of cysticercosis in cattle, 818; 3647; prenatal infection of calf with *C. bovis*, 818; *Cysticercus ovis* in U.K., 1533; susceptibility of various animals to *coenurus cerebralis*, 2613; cysts of *hydatigena* in New Zealand sheep, 3648-9.

TAIL Ringtail in rat, 897.

TALFAN DISEASE see Encephalomyelitis, porcine.

TANGANYIKA see Reports.

TEATS see Mammary gland.

TECHNIQUE

Bacteriological Differentiation of *Enterobacteriaceae*, 45; culture medium for salmonella, 46; vegetable culture media, 1022; medium for vibrio, 1050; 1057; continuous-flow culture, 1653; standard culture medium, 2023; method for disinfecting bacteria, 2081; yeast culture medium, 2095; sticky tape method for skin organisms, 2802; medium for staphylococci, 2803; medium for salmonella, 3873; types of closures for culture tubes, 3847.

Chemical Photometric analysis of Ca, Na and P, 552; determination of organo-phosphorus compounds in food, 1993; cathode-ray polargraphy for Ca and Mg in blood, 3093; neutron activation analysis of Na, K and P, 4208.

Collection of body fluids and tissues Laparotomy for liver samples from lamb, 1656; blood from jugular vein of turkey, 1656; uterine biopsy, 2008; faeces from ewe, 2387; c.s.f. from pig, 2780; urine from cow, 3112; liver samples from pig and sheep, 3818; testicle biopsy, 4199.

Electron microscopy see Encephalomyelitis, equine; Encephalomyelitis, porcine; Fowl paralysis; Genital system, placenta, testicle and uterus; Hepatitis, canine virus; Myxomatosis; Neoplasms, general; Respiratory system, general; Rhinotracheitis, bovine; Semen and spermatozoa; Stomatitis, vesicular.

Electrophoresis Effects of delayed examination of blood samples, 2024; agglutination test on electrophoresed serum, 3163; factors influencing serum electrophoresis in cattle and sheep, 3765; of bacterial toxins, 3894.

See also Blood, chemical composition.

Histological Measurement of cell volume, 976; book on photomicrography, 1318; cell shedding in intestinal mucosa, 1975; wax plate reconstruction of liver, 3769;

TECHNIQUE—Histological—[cont'd.]

fluorescence microscopy of eosinophiles, 3816; fixing with ethylene glycol compound, 4206.

Injection Needle transmission of canine hepatitis, 1133; jet injection in cow and dog, 2025; simultaneous infusion and blood sampling, 3111.

Parasitological Cultivation of nematodes, 824; separation of helminth eggs from faeces, 2651; estimation of worm burdens, 1852; testing anthelmintics on fowl, 1874; frozen sections of arthropods, 2982; culture medium for protozoa, 3558; flotation method for nematode eggs, 3660; culture medium for *Trichomonas*, 3924.

Staining Vital stains for microfilariæ, 1189; acridine orange and bull semen, 1630; trypan blue injected into pig, 3597.

Tissue culture Erythrocyte adsorption reaction, 134; adsorption of viruses, 136; in protozoology, 390; sheep kidney cells, 405; comparison of kidney cells from various animals, 452; 3110; properties of glass surfaces, 580-1; phagocytosis by cells, 653; PLO contamination, 680; metabolic poisons and cultured kidney cells, 1787; bovine mammary gland, 2385; viruses in Strain T9 cells, 2525; monolayers of bovine thyroid, 2925; whey as nutrient for pig kidney cells, 2939; latent viral infection, 2958; virus and cell metabolism, 3262; lymphoid tissues, 3276; maintenance medium, 3525; review, 3515; plaque formation under methylcellulose, 3943.

See also Anaemia, equine; Anjeszky's disease; Distemper; Encephalitis, tick-borne; Encephalomyelitis, equine; Hepatitis, duck virus; Histomonas; Pelittosis; Rabies; Rhinotracheitis, feline; Swine fever; Toxoplasma infection.

TEETH Changes in dog with rickets, 503; inherited anomalies in horse, 578; development in dog, 1973; 3408; dental crowns for cow, 2781; premature loss of incisors in sheep, 3038; comparative pathology, 4110.

TELADORSAGIA In British sheep, 1541.

TEMPERATURE

Body During oestrous cycle in cow, 949; of new-born pig, 1267; of unfeder pig, 1556; comparison of breeds of sheep, 1596-7; regulation in fowl, 1960; control by brain temperature in cattle, 2334; regulation in camel, 3398; regulation in cattle, 1959; 4145; regulation in buffalo calf, 4146; regulation in new-born lamb, 4147; regulation in rat, 4148.

Environmental Comparison of Shorthorn, zebu and Santa Gertrudis cattle, 244-8; oxygen consumption of cattle, 247; effect on salivation in buffalo, 248; heat tolerance of cattle, 249; 3811; heat tolerance of sheep, 250; effect of heat stress on chick, 251; high temp. and thyroid function in cattle, 556; 557; low temp. and thyroid function in pig, 558; and metabolism of steers, 928; responses of man to hot climate, 2721; heat tolerance of buffalo calf, 3397; new-born mammals and environmental temperature, 3399-40; heat stress in pig, 3753; effect on thyroid function in sheep, 4181; summer shelters for cow, 4186; influence on piglet, 4186; effect on fertility in ewe, 4201.

TENDONS Healing in fowls, 1982.

TERATOLOGY Hare-lip in cattle, 575; cyclopiæ malformation in lamb, 963; malformed rats from injection of tissue antibodies, 2969; malformations in milk-fed rat, 3351; malformations from heliotropine in rat, 3746; malformed pigs from sow deficient in vitamin A, 4084.

TEREPHTHALIC ACID Plus antibiotics for fowls, 862; 4138.

TERRAMYCIN see Oxytetracycline.

TESCHEN DISEASE see Encephalomyelitis, porcine.

TESTICLE see Genital system.

TESTOSTERONE see Sex hormones, androgens.

TETANUS see Clostridium tetani.

TETANY see Magnesium; Nervous system, diseases.

TETRACYCLINE For porcine virus pneumonia, 431; 1129; high level in chick feed, 495; persistence in bone, 920; for bovine pleuropneumonia, 1074; for avian spirochaetosis, 1746; Reverin for vibriosis in bull, 3530; local lesions after injection into rabbit, 4137.

TETRAMERES In proventriculus of duck, 1863.

THALLIUM Poisoning in dog, 526; 2704.

THEILERIA ANNULATA INFECTION In East African cattle, 382; Berenil ineffective, 384-6; combined therapy in cattle, 708; 3584; skin lesions in cattle, 1424; in a hare, 3563; toxin produced by parasite, 3564.

THEILERIA PARVA INFECTION Tick transmission, 383; macrophages, 1086; mild form of East Coast Fever, 2147; connective tissue reactions, 2493; lab. animals not susceptible, 3938; chimpanzee and monkey not susceptible, 3939.

THELAZIA In eye of cattle, 1186; in conjunctiva of horse, 1875.

THENIUM see Anthelmintics.

THERAPEUTICS & PHARMACOLOGY Supplement to International Pharmacopoeia, 980; veterinary uses of magnesium acetylmethionate, 1260; furaladone condemned, 1691; supplement to U.S. Dispensatory, 1665;

para-bromophenyl isothiocyanate, 1866; chelating agents, 1937; action of aspirin, 1951; action of gentian on rumen, 2326; 2327; list of proprietary drugs, 2714; diuretics tried on sheep, 2716; new and nonofficial drugs, 2789; dimethyl nitroimidazole for blackhead, 2894; triethylene thiophosphoramide for bone tumours, 3006; iodochlorhydroxyquinoline and phenathroline, 3069; properties of hormones, 3070; fluid and electrolyte therapy in monkey, 3388.

THIABENDAZOLE Action and uses, 4031-6.

THIOACETAMIDE Liver injury, 1945.

THIOMERSAL see Rabies, virus.

THIRAM see Poisoning, organic poisons.

THORN'S TEST see Adrenal gland.

THYMUS GLAND Thymectomy in calf, 1284; surgical removal in rat, 2026; virus necrosis in mouse, 3262.

THYROID GLAND

General Iodine metabolism in cattle, 556-7; iodine metabolism in pig, 558; 3736; histology in pig, 1285; goitrogen in clover, 1571; function in sheep, 2358; 4181; radio-iodine in fowl, 3356; thyroidectomy and blood of sheep, 3404; function in cow, 4180.

Diseases Goitre as cause of death in lamb, 194; diagnosis by radio-iodine, 195; sporadic goitrous cretinism, 194.

Thyroxine Absorption from gut in cow, 937; influence on Ca and Mg in calf, 2733; absorption of pellets implanted into sheep, 3089; treatment of foot and mouth disease, 3569; effect on hens' egg, 3781.

THYSANIEZIA In sheep, 1164; 2241.

TICK FEVER In cattle, 3445.

TICK PARALYSIS see Ticks, Ornithodoros.

TICKS

General Identification by chaetotaxy, 800; liveweight gains after treatment for ticks in cattle, 1999; on migrating birds, 2229; control in Nyasaland, 2396; lethal action of silica aerogel, 2592; in Portuguese Timor, 2601; laboratory rearing, 2603.

Argas Rickettsial bodies in *A. persicus*, 3269.

Amblyomma Insecticides tested on cattle, 801; kangaroo tick on sheep, horse and cattle, 1622; in nose of ape, 2231.

Boophilus Survival of *B. microplus*, 1520; *B. microplus* and DDT, 1521; eradication in U.S.A., 2602; control of *B. decoloratus* by pyrethrum sprays, 2978.

Haemaphysalis Transmission of Kyasanur virus, 1451.

Hyalomma Transmission of Q fever, 2584; carriage by birds, 2579.

Ixodes Virus neutralization by ticks, 1110; transmission of foot and mouth virus, 1784; Australian species on horse, ox, sheep, pig, dog and cat, 1842.

Ornithodoros Experimental tick paralysis in sheep and dogs, 1843.

Rhipicephalus Lab. rearing, 383; everts in U.S.A., 1157; resistance to parasiticides, 2230; free-living phases of everts, 3292; control of appendiculatus with coumaphos, 3293.

TIN see Anthelmintics.

TOCOPHEROL see Vitamin E.

TOLBUTAMIDE Action on fowl, 2328; for diabetes in cat, 3355.

TONGUE see Digestive system, tongue

TORTOISES Diseases, 3036.

See also Rickettsia infection, Q fever; Salmonella infection, general.

TOXAPHENE see Parasiticides.

TOXASCARIS Poultry as reservoir hosts, 478.

TOXICOLOGY see Poisoning.

TOXOCARA Poultry as reservoir hosts, 478; experimental infection of sheep, 834; intradermal test, 3315; superinfection of mouse, 835; intra-uterine infection of dog, 2251; post-parturient infection of bitch, 2647; *T. canis* in sheep, 3664.

TOXOPLASMA INFECTION Antibodies in domestic animals, 91; 1780; epidemiological relationship between dog, cat and man, 388; experimental in cattle, goat, pig and c.f. inhibition test, 1089; in cattle, pig and man, 2900; antibodies in veterinarians and butchers, 389; in dog, 387; 709; 711; 1091; 1430; 2498; lesions in nervous system of dog, 710; in sheep, 1087; in pig in U.K., 1088; in pig in Netherlands, 3210; c.n.s. lesions in pig, 1090; in deer, 1429; in hens' egg, 2148; neuropathology in sheep and cattle, 2494; in ewe, 2495-7; 2901; in *soulsika*, 2500; stillbirths in cattle, 3209; toxoplasma toxin, 1092; plate c.f. test, 2149; diagnosis by fluorescent antibody, 2499; influence of nutrition, 2902; diagnosis and epidemiology, 3211; congenital transmission in mouse, 712-4; 3212; tissue culture, 3213; 3568; mechanism of serological tests, 3567.

TOZOICIDE For trypanosomiasis, 3556.

TRANQUILLIZERS Action of chlorpromazine on horse, 241; 2462; action of chlorpromazine on cow, 242; chlorpromazine for wild animals, 1595; lactation induced by chlorpromazine in rats, 1967; Combelen (propionylpromazine) in cattle, 2714; action of reserpine on mink, 3391;

- TRANQUILLIZERS**—[cont'd.]
chlorpromazine for heat stress in pig, 3753; propionylpromazine in mouse, 4141.
- TRANSFERRIN** Types in cattle, 3804; 4159.
- TRANSMISSIBLE GASTRO-ENTERITIS** see Gastro-enteritis, porcine.
- TRANSPLANTATION OF TISSUES** Tissue tolerance in sheep, 1150.
- TRANSPORT OF ANIMALS** Effect on urinary creatinine and muscle glycogen of pig, 2722; transport in Australia, 3812; recommendations for carriage of live animals by air, 3813; transport tetany in cattle, 4092.
- TREMOR** see Nervous system, diseases.
- TRIAMCINOLONE** see Steroids.
- TRICHINELLA** Survival in pork, 153; microprecipitin test on dog, 469; effect of temporary cold storage of meat, 470; experimental infection of pig, 1169; immunological tolerance, 1170; precipitation test on pig, 1850; biology of larvae, 4027.
- TRICHLORPHON** see Anthelmintics; Parasitocides.
- TRICHOCEPHALUS** Inactivation of eggs by X-rays, 2625; survival of eggs in silage, 3308.
- TRICHODESMA** Role in suliyuk disease of horse, 321.
- TRICHOMONAS INFECTION** In duck, goose and fowl, 376; *T. gallinae* in Australian fowl, 1419; action of metronidazole on trichomonads, 1080; 1420; in caecum of rat, 2150; intracellular location of *T. vaginalis* and *gallinae*, 2488; isolation from gut contents, 3558; pathogenicity for mouse of *gallinae* and *gallinae*, 3923; fumagillin in culture media, 3924; metronidazole therapy in mouse, 3940.
- TRICHOMONAS FOETUS INFECTION** Contamination of semen, 87; culture medium, 375; amino-acricline treatment of bull and cow, 2137; 2138; survival of *T. foetus*, 2139; preservation of *T. foetus*, 2487; treatment of cow, 3557.
- TRICHOPHYTON** Status of quinceanum, 1070; production of trichophylin, 3904.
See also Ringworm.
- TRICHOSPORON** Infection in a buffalo, 1068.
- TRICHOSTRONGYLUS** X-irradiated larvae in lamb, 822; irradiated larvae of colubriformis, 1539-40; *T. axei* in horse, 1860; action of ultra-violet on larvae, 2620; action of synergized phenothiazine, 2993; retortaeformis in squirrel, 3001; tenuis in pheasant, 3002; colubriformis in sheep, 3307.
- TRIETHYLENEMELAMINE** see Swine fever, virus.
- TRIETHYLENE THIOPHOSPHORAMIDE** For bone tumours, 3006.
- TRITHIADOL** see Eimeria infection, treatment.
- TROLENE** see Parasitocides, ronnel.
- TRYPANBLUE** As vital stain in pig, 3597.
- TRYPANOSOMA INFECTION**
General Concentrating trypanosomes in blood, 373; *T. helogalei* in mongoose, 696; Inter-African symposium, 1076; immune response of antelope, 1077; in wild birds, 1771; in hippopotamus, 2136; cortisone, X-rays and *T. lewisi* in rat, 2486; evansi in camel, 2890; properties of rangeli, 2891; low-temperature preservation of trypanosomes, 2892; elimination of *T. melophagium* from sheep and keds, 3205; in Africa, 2134; 2483; in cattle in Nyasaland, 2396; in Rhodesia, 3446; in Sudan, 3204; in cattle in Uganda, 2395; report of West African Institute, 3919; soluble antigens, 3921; volutin granules in trypanosomes, 3922.
Swine Pig not susceptible to *T. equinum*, 85; simiae infection in Sierra Leone, 589; treatment of simiae infection, 1418; 3556.
Treatment Action of drugs on trypanosome extracts, 86; quinapyramine (Antrycide) and Prothidium prophylaxis in cattle, 694; homidium-resistant trypanosomes, 695; action of homidium, quinapyramine and suramin, 1078; resistance to Berenil, 1079; quinapyramine (Antrycide) with suramin for *T. simiae* in pigs, 1418; effects of Prothidium on *T. evansi*, 1770; suramin-ethidium complex, 2889; suramin, quinapyramine and Berenil for camels, 2890; comparison of drugs, 3446; metamidium, tozocide and nucleocidin for pig, 3556; Prothidium in zebu, 3920.
- TRYPANOSOMA BRUCEI** Compared with *T. rhodesiense*, 1416; soluble protective antigen, 1417; comparison of strains, 2135.
- TRYPANOSOMA CONGOLENSIS** Types, 1415.
- TRYPANOSOMA EQUINUM INFECTION** Pigs not susceptible, 85.
- TRYPANOSOMA EQUIPERDUM INFECTION (DOURINE)** Metabolism of equiperdum, 374; dourine in Sudan, 1769; in Korea, 2133; passage in rabbit, 2133; role of thromboctes, 2484; resistance of rat, g.pig and rabbit, 2485.
- TRYPANOSOMA EVANSI** Changed by Prothidium, 1770.
- TUBERCULIN** see Mycobacterium tuberculosis infection.
- TULARAEMIA** see Brucella tularensis.
- TUNISIA** see Dogs, diseases general; Echinococcus.
- TURKEY** see Echinococcus; Fasciola; Leptosira infection.
- TURKEYS** Pendulous crop, 1232; collection of blood from jugular vein, 1656; inherited tremor of head, 2022; ulcerative enteritis, 2059; virus hepatitis, 2210; Rous sarcoma and parthenogenesis, 2211; entero-hepatic syndrome in poult, 2307; viral meningo-encephalomyelitis in Israel, 2959; groundnut poisoning, 3384; 4118.
See also Air sacs; Eimeria infection, avian; Encephalomyelitis, equine; Hexamita meleagridis; Histomonas meleagridis; Liver, general; Muscular system, diseases; Neoplasms; Newcastle disease; Parthenogenesis; Photosensitization; Psittacosis; Semen and spermatozoa; Staphylococcus infection; Zinc.
- TURTLES** see Escherichia freundii.
- TWINS** see Multiple births.
- TYLOSIN** For PPLO infection in chick, 1767.
- TYMPANITES** Soya bean oil therapy, 855; incidence increased by feeding soya bean oil, 1202; clover and rumen bacteria, 1558; gas formation by legume extracts, 2268; in calf, 2658; lucerne bloat, 2659; 3015; 3328; silicone therapy, 4066.
- UGANDA** see Glossina; Reports.
- ULTRA-VIOLET LIGHT** Inactivation of foot and mouth virus, 1098; inactivation of rabies virus, 2516; action on helminth larvae, 2620.
- UNCINARIA** In dog in Australia, 2622; bephenium treatment of dog, 2988; irradiated vaccine for dog, 4037; treatment with thienum, 4038.
- UNION OF SOVIET SOCIALIST REPUBLICS** see Agalactia, Contagious of Sheep and Goats; Babesia infection; Chronic respiratory disease; Clostridium welchii infection; Foot and mouth disease; Leptosira infection, swine; Listeria monocytogenes infection; Rabies; Reports; Statistics, livestock; Swine fever; Swine, virus diseases.
- UNITED KINGDOM** see Abortion, equine virus; Brucella infection; Clostridium welchii infection; Eperythrozoon; Food hygiene, general; Foxes; Fowls, diseases general; Leptosira infection, man; Lungworms, sheep; Milk, bacterial content; Mycobacterium johnei infection; Mycobacterium tuberculosis infection; Psittacosis; Reports; Salmonella; Swine, general; Taenia; Toxoplasma infection.
- UNITED STATES OF AMERICA** History of vet. medicine, 2408; danger of importing diseases, 2961; defence against biological warfare, 3055.
See also Abortion, cows; Bluetongue; Brucella infection; Dirofilaria; Encephalomyelitis, avian; Encephalomyelitis, equine; Mycobacterium tuberculosis infection, cattle; Reports; Rickettsia infection, Q fever; Scrapie; Stomatitis, bovine virus; Ticks.
- UREA** Seasonal changes in urea in blood of cow, 174; toxicity for cattle, 3382; toxic when mixed with soya bean meal, 3383.
- URETHANE** Influence on lymphatic system of pig, 3598.
- URINARY SYSTEM**
General Diuresis and electrolyte excretion in cow, 1618; flow of urine in fowl, 1619.
Diseases Urolithiasis in sheep, 2269; 3330; silica uroliths in sheep, 2338; diet and calculi in rat, 3022; 3677; urolithiasis in cattle, 3678; 4093; structure of concretions from ox, sheep, dog, 4094.
Urine Composition from cow with ketosis, 200; lactosuria in cow, 204; indoleacetic acid in animals, 307; androgens in cow urine, 1294; oestrogens in stallion, 1636; lactoglobulins in calf, 1985; oestrogens in mare, 2371; proteins in calf, 2738; collection from cow, 3112; antibiotic residues in urine, 3392; silicon content in cattle, 3678.
- UROLITHIASIS** see Urinary system, diseases.
- UTERUS** see Genital system.
- VAGINITIS** see Genital system, vagina.
- VENEZUELA** FAO report on horses, 1457.
See also Babesia infection, cattle; Mycobacterium tuberculosis infection, cattle; Myxomatosis; Newcastle disease, virus; Nocardia; Oestradae; Gastrophilus.
- VENTILATION** see Farm buildings.
- VERATRUM** Action on rumen, 2326-7.
- VERMIN CONTROL** Rabbits in Australia, 2753; the anticoagulants LM 83 and LM 91, 3743; control of rats and mice, 3787.
- VERTEBRAL COLUMN** Spondylitis in dog, 579; 2696; spondylitis in pig, 894; normal ossification in dog, 3066.
See also Intervertebral discs.
- VESICULAR EXANTHEMA** see Exanthema, vesicular.
- VIBRIO INFECTION** Properties of pathogens and saprophytes from cattle, sheep, fowl, 352; swine dysentery, 354; 2805; hepatitis in fowl, 2464.
- VIBRIO FETUS INFECTION** Survey for antibodies in cattle, sheep, pig, fowl, man and monkey, 78; in cattle

VIBRIO FETUS INFECTION—[cont'd.]

in Australia, 79; 1754; incidence in Germany, 656; incidence in England, 657; action of neomycin, 661; infection of placenta, 1035; bulk culture of *V. fetus*, 353; growth factors, 1050; selective medium, 1057; study of 60 bovine strains, 1394; bovine strain from sheep, 3191; c.f. test not specific, 1395; antigens of *V. fetus*, 1396; abortion in cow, 1398; experimental infection of heifers, 1755; vaccines for sheep, 2107; classification of *V. fetus*, 2108; vaccine for cattle, 2394; placental lesions in sheep, 2878; FAO handbook, 3190; treatment for bull, 3530; indirect haem-agglutination test, 3531; ovine strains in heifers, 3890; serotypes, 3891.

VIET-NAM see Reports, Rinderpest.

VIROLITINE Inactive against Borna virus, 743.

VIRUS B Incidence in monkey, 1452; in monkey in Japan, 2579; review, 3611.

VIRUSES, GENERAL Arthropod-borne viruses, 102-4; 417; 1112; 2171; 3953-4; arthropod-borne virus antibodies in cattle, sheep, goat, 2918; advances in virus research, 2401; book on lab. methods in virology, 3450; immunity from formalized vaccines, 105; myxovirus antibodies in pig, 128; tumour-destroying virus from mouse, 133; uses of the c.f. test, 404; 3236; purification and concentration, 414; diseases with inclusion bodies, 792; indoor climate and virus survival, 793; 1507; new virus from respiratory disease in fowl, 1140; respiratory viruses of horse, pig, duck, 1450; Kyasanur forest disease, 1451; viral persistence in cultures, 1502; relationships between human and animal viruses, 1506; GAL virus, 1551; 2204-5; 2577; 3225; anti-viral action of pyrimidines, 1825; haemorrhagic disease in deer, 2179; from nose of pig, 2191; viral antibiotics, 2215; a classification, 2503; adenovirus from calf faeces, 2538; attenuation by mixture with other viruses, 2557; chick-embryo lethal orphan virus, 2576; diagnostic antigens prepared by irradiation, 2917; structure of virus N, 2953; ion-exchange adsorption of antigens, 2963; book on principles of animal virology, 3115; thymus necrosis in mouse, 3262; haemabsorbing virus from calf, 3595; latent virus from rat, 3608; salivary gland virus in mouse, 3610; thiomercarbazon antiviral compounds, 3976; Powassan virus in Canada, 3978; haemorrhages in rodents caused by Thal virus, 3979; simian foamy virus, 3980; pathogenesis in chick embryo, 3992; diagnostic aids in human virology, 3994; antiviral compound "1758", 3995; changes in poliovirus after multiplication in gut, 3996; concentration by gel filtration, 3997.

VISNA Properties of virus, 425; 1475.

VITAMINS

Vitamin A In avian coccidiosis, 89; fertility suppressed by high doses, 502; prophylaxis of coccidiosis, 704; deficiency in pig, 870; 4084; role in coughing in pig, 1010; 1903; in liver of cow, 1216; chlortetracycline and deficient rat, 1904; deficiency in germ-free rat, 2285; influence on Newcastle disease, 2956; eye disease in deficient calf, 3026; deficiency in cattle, 4083.

Vitamin B (general) Pantothenic acid deficiency in pig, 872; animals exposed to aerosols, 1111; rumen synthesis, 1509; biotin deficiency and mange in hamster, 2605; urinary calculi in pyridoxine-deficient rat, 3022; treatment to reduce piglet losses, 3029.

Vitamin B 12 Distribution in bitch and pup, 193; monograph, 593; hydroxycobalamin in dog, 1909; in ewe's milk, 2287; deficiency in sheep, 3028; inhibited by bile, 3706.

Vitamin C (ascorbic acid) Joint lesions in g.pig, 873; in adrenal of fowl, 1083; in blood of cow, 3710.

Vitamin D For milk fever, 181; 197; 2288; lesions due to excess in dog, leopard and tiger, 541; D3 and bovine fertility, 573; D3 and serum Mg in sheep, 1217.

Vitamin E (tocopherol) Role in muscular dystrophy in cattle, 190; chlortetracycline and vitamin K in E-deficient rat, 856; requirement of chick, 871; muscular dystrophy in pig, 1218; deficiency in monkey, 1908; prevention of abortion in cow, 1957; metabolism in rabbit, 2676; deficiency in camel, 3027; functions of, 3703; deficiency in pig, 3704.

Vitamin K In chick with coccidiosis, 1773; 2144; haemorrhagic disease in chick, 2286.

VITILIGO see Skin, diseases.

VULVOVAGINITIS, INFECTIOUS PUSTULAR see Rhinotracheitis, bovine infections.

WARFARIN Poisoning in dog, 4115.

WARTS see Neoplasms, cattle.

WATER METABOLISM In sheep, 2719; in desert animals, 3079; myotonia in goat, 3679; requirements of European and zebu cattle, 3758; dehydration in camel, 4152; dehydration in rat, 4153; restriction of water intake for zebu cattle, 4164.

WATER SUPPLIES Survival of leptospirae, 76; 2876; nitrate poisoning in cattle, 907; sheep select sodium solutions, 1210; polluted water as cause of disease in cattle and sheep, 1998; haemoglobinuria from excessive drinking in calf, 2255; optimum temperature for cattle, 3676; action of saline on kidney function in sheep, 3700; effect of high mineral content on lab. animals, 3701; intake of zebu cattle, 3757; toxicity of nitrates and nitrites, 4111.

WEED KILLERS see Herbicides.

WESSELSBRON VIRUS Rodents not susceptible, 2171; antibodies in cattle, sheep and goat, 2918.

WHALES (CETACEA) see Adrenal gland.

WHITE MUSCLE DISEASE see Muscular dystrophy.

WILD ANIMALS & BIRDS Salmonella in gulls, 53; 337; leptospirosis in aquatic birds, 77; erysipelas in wild pig, 327; review of diseases, 519; report on diseases in Italy, 597; encephalomyelitis virus in snake, 749; rinderpest in impala, 755; aorta lesions in sea lion, 901; quail enteritis, 1003; histoplasma in baboon, 1066; trypanosomes in antelope, 1077; malignant catarrh in blue wildebeest, 1117; gout in reptiles, 1247; coccidia in wild mammals, 1421; rabies in Florida, 1442; immunization of game animals against rinderpest, 1460; diseases of dolphin and seal, 1575; immobilization by use of drugs, 1595; 3108; brucella in Tibetan hare, 1733; tuberculosis in chamois, badger, deer, swan, and other animals, 1757; trypanosomes in birds, 1771; Amidostomum in birds, 1862; arthropod-borne viruses in African rodents, 2171; haemorrhagic disease in deer, 2179; African swine fever in wart hog, 2185; ticks in migrating birds, 2229; schistosomes in baboon, 2237; 3644; echinococcus in Ceylon jackal, 2240; diseases of captive wild birds, 2293; leptospirae in skunk, 2456; coenurus in antelope, gazelle, wild sheep and goat, 2613; salivary gland virus in gerbil, 2700; reproduction in birds, 2774; helminths of squirrel, 3001; losses from toxic chemicals, 3066; stomatitis in snake, 3150; mange in dingo, 3295; diseases of bison in Canada, 3141; WEE in wild duck, 107; 3235; parasites of the Anatidae, 3278; pox in mourning dove, 3583; book on biology and physiology of birds, 3830; Babesia in African bush pig, 3937; Balantidium in capybara, 3941; Powassan virus in chipmunk and squirrel, 3978; schistosome in raccoon, 4020; mortality in the kaola, 4091; Japanese quail as lab. animal, 4149.

See also Deer; Foxes; Haplosporangium; Hares; Kangaroos; Leptospira infection; Monkeys; Newcastle disease; Partridges; Psittacosis; Rickettsia infection, Q fever; Salmonella infection, avian; Whales.

WOHLFARTIA Myiasis in sheep, 3638.

WOOD PRESERVATIVES see Poisoning.

WOOL Seasonal variations in growth, 250; silky mutation in Merino, 578; fleece characters and wool yield, 984; wool follicles in sheep, 2724; influence of nutrition, 3013; studies with radiol sulphur, 3053-4.

WORLD HEALTH ORGANIZATION see Rabies.

XANTHOMA see Neoplasms, fowls.

X-RAYS see Radiations; Radiography.

YOMESAN New drug against tapeworm, 1165-7.

YUGOSLAVIA Diseases of imported cattle, 511.

See also Foot rot; Horses, diseases general; Leucosis, cattle; Nematodirus; Rhinotracheitis, bovine.

ZANZIBAR see Reports.

ZEBRAS see Zoo animals.

ZEBU CATTLE Pleuropneumonia immunization, 1073; Australian lines, 2775; habits on pastures, 3109.

See also Anthelmintics, cattle; Blood, picture; Digestive system, ruminant digestion; Hair; Helminth parasites, cattle; Infertility, cattle; Neoplasms, cattle; Skin, general; Trypanosoma infection; Water metabolism; Water supplies.

ZINC In hair of cattle, 1286; deficiency in chick, 1902; deficiency in calf, 2674; deficiency in turkey, 3020; effect on copper metabolism, 3344; parakeratosis in pig, 3599; metabolism of radiozinc in dog, mouse, rat, 4154.

ZOALENE see Eimeria infection.

ZOO ANIMALS Births and deaths in Rotterdam zoo, 203; stachybotryotoxicosis in hippopotamus and bison, 363; plasmodium in penguin, 381; hypervitaminosis D in leopard and tiger, 541; circulation in the giraffe, 932; lung cancer in camel, 1191; nutritional disease of lion, 1215; International zoo yearbook, 1688; Johne's disease in African dwarf goat, 1689; anthelmintic for zebra, 1869; trypanosomes in hippopotamus, 2136; neoplasms and virus hepatitis in birds, 2260; haematology of lion, 2342; vitamin E deficiency, 3027; myopathy in quokka, 3705; diseases of zoo animals, 4090; anaesthesia of lion, 4144.

ZOONoses see Man.

ERRATA

page 55, abstract 313. Translation of title should read: Allergic reaction to intracutaneous albumose-free standard tuberculin

page 198, abstract 1141. Lissot, M. G. should read Lissot, G.

page 533, abstract 2963. Change 'J. Dairy Sci. 28' to 'Science 133'.

pages 614-615, abstract 3438. The author of this work is F. Paredis and not M. Vandeplasseche.

page 717, abstract 4019. Lines 2 and 3 of abst. should read: bilirubin content per 100 ml. serum was 0.13 mg. and the average total content 0.4 mg.

